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VETERINARY MEDICINE

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No. 5

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Veterinary Medicine in Indiana

This issue includes all, except three, of the discussions on the scientific program of the 65th annual meeting of the Indiana Veterinary Medical Association, which convened in Indianapolis in January. The three discussions not included, one on poultry disease problems by Dr. H. E. Moses and two on the diseases of swine by Dr. H. C. H. Kernkamp will appear in an early issue.

The officials of the Association mainly responsible for this excellent program were, Dr. Charles C. Dobson, New Augusta, president, Dr. Wade W. Garverick, Zionsville, secretary, and Dr. J. L. Kixmiller, Indianapolis, program chairman. They were ably supported by all committees and many others. A feature of the convention was the joint opening session of the I.V.M.A. and the Ladies Auxiliary, at which the annual addresses of both President Dobson and Mrs. H. W. Demsey, Huntington, president of the auxiliary, were delivered. A.V.M.A. president, Dr. L. M. Hurt, Los Angeles and A.V.M.A. Auxiliary president, Mrs. A. E. Bott, East St. Louis, Ill., also attended this opening session. As veterinary associations range in membership, the I.V.M.A. is not a large association, but it is an active one, as this varied, high quality, program indicates.

Although the state veterinary associations in a dozen or more states are older than the I.M.A., 65 years has encompassed most of the development of veterinary medicine in Indiana and the country at large. When the first meeting of the I.V.M.A. convened at Indianapolis in 1885, the federal B.A.I. had been established less than a year and was nearly unknown to livestock producers. Federal meat inspection was five years in the future, but our ministers to England, France, and Germany had already been instructed "to obtain all possible information about the inspection of hog products."

The subject most discussed at veterinary meetings and in the veterinary press 65 years ago was veterinary legislation. A close rival for attention was veterinary education. Most practitioners regarded the courses of instruction, then given in the best of their veterinary colleges, as being inadequate and the courses in the poorer schools and in the "diploma mills" as being frauds. Chairs of veterinary science recently established in Michigan, Ohio, and Missouri were declared to be "empiric nurseries" by the editor of the *American Veterinary Review*. There seemed to be general agreement with this appraisal.

Within the decade preceding 1885 a dozen midwestern states and territories and one or two eastern states had created the office of State (or territorial) Veterinarian. These offices had amply justified themselves. It was Dr. Geo. C. Faville, State Veterinarian of Colorado, who gave the first assurance that an outbreak of disease among cattle in Kansas in 1884, was not, as it had been locally diagnosed, foot-and-mouth disease. This allayed nationwide excitement and stopped quarantines and interference with commerce. In the following year Dr. N. H. Paaren, State Veterinarian of Illinois, performed a like service, when he diagnosed an outbreak of disease among cattle in Lawrence County, Indiana, as ergotism. It had been widely heralded as foot-and-mouth disease.

Message from the President of the A.V.M.A.*

By LESLIE M. HURT, B.S., D.V.M.
Los Angeles, California

I BRING you greetings from the officers and directors and the central office of the American Veterinary Medical Association. Most of you I think, are fairly well acquainted with the nature of our organization. Most of you have been informed in years past on the working schedules of the different members of the office and their duties and possibly the different projects have been described at previous meetings of your Association.

However, the American Veterinary Medical Association is not a young organization. It is about 77 years old. It has been growing all that time. All of you recognize, I think, that the A.V.M.A. has grown not only in numbers but in quality, and in the acquisition of material for the advancement of veterinary science.

Omitting reference to older activities with which you are familiar, I shall mention briefly the more recent projects of the Association. Among these I think the principal one is the public relations activity.

During the past five years, the American Veterinary Medical Association has had a very active committee on public relations. The effectiveness of the work of this committee stands out in all our minds. The Interprofessional Association meets frequently—the American Medical Association, the American Dental Association, the Farm Bureau, and so on. Our men who are selected to attend those meetings are not particularly selected for their personal qualifications. They are selected more or less at random according to the location of the meeting. They have been so completely acceptable to others of the group that we are invited to come back.

As you know, we have several different exhibits, especially one on rabies and one on swine erysipelas, which have been widely circulated and have had good acceptance. These have carried to the different bodies where they are shown a new idea of the usefulness of veterinary service in connection with the control of these diseases, both of which are important to public health.

The medicos and the dentists have accepted us wholeheartedly and it is fortunate, too, because the troubles ahead are intermingled so closely that they can't be separated very well on the basis of the veterinary public health. As Doctor Meyers pointed out to us, we have at least 24 diseases that are interchangeable between man and animals. There are 75 diseases in which animals form a reservoir for human infection.

Veterinary research is extremely important to the profession. The Association has gone on record in favor of veterinary research. Two years ago a subscription list was opened up, allowing the veterinarians of America to contribute to a research fund, and as the result we have $85,000 in the treasury, which will be used to establish fellowships for the young veterinary graduates who show particular qualifications for research or teaching or both.

Our research fields have a crying need for men and I think most of you realize the teaching situation is faced with the same problem. Piracy is being practiced in the veterinary educational field; one group simply going out and taking veterinarians from the other fellow. That is unfortunate. We should have youngsters coming along to take these teaching positions. I think most veterinary institutions are paying at least as much as other public service institutions are. That is not as much as it should be, but it is much better that it was five or 10 years ago.

We are equipped as an organization to go to Washington or almost anywhere and support the veterinary profession. The advance in classification of the veterinarian in the Bureau of Animal Industry is an example. There is hardly a major problem in connection with the control of animal disease upon which the A.V.M.A. had not been asked for advice before definite action was taken. We hope this will continue. We believe it is bound to continue because our place is assured from the success of the past and from the impression made by our representatives before these different committees and organizations.

This public relations program is amplified so far as the public is concerned by a series of radio releases. Four or five years ago there were about 300 radio stations receiving them. Then the number for a time declined but last year it flared up again and more than 500 were receiving them. Most of you know what they are. They are radio releases on diseases and disease topics of interest to the public. They are handled largely by state and local associations. In that way they can be screened so as to have some local application. Where releases go direct to the radio stations a slip sometimes occurs and a disease is discussed which doesn't occur in that section, thus un-

*Notes from an address at the 65th annual meeting, Indiana Veterinary Medical Assn., Indianapolis, Jan. 13, 14, 15, 1949.

necessarily alarming some hearers. Where releases are sent through state associations such slips are avoided.

I was glad to hear the report of your Public Relations Committee this morning, in which you had 27 releases during the year, in which one or more veterinarians appeared on radio programs. I think that is important. Dialogue is much more interesting to the public on the radio than a single narrator.

We have sent almost five thousand releases to the daily press and the farm press. It is remarkable how favorably they have been accepted. They are authentic, sharp and right to the point.

In order to amplify the program, we have added one more member to the wholetime central office staff this year. We have needed him because the staff membership was being, I would say, overworked anyway and the new man will have quite a bit to do with publicity, when he gets oriented.

Our public relations program has been helped immeasurably by the ladies auxiliary. We had a great illustration of that at the opening of this meeting. It surprises some of us who have been attending these meetings for a long time. Their projects are greatly to the benefit of the veterinary profession of America. We didn't realize what they could do in their local clubs, women's clubs and Parent-Teacher Associations. I am proud of their work.

A National Board of Veterinary Examiners was first talked of 17 years ago. When I came on the Executive Board, one of the first projects that was started was the National Board of Veterinary Examiners. We were copying somewhat the success of the American Medical Association, the American Dental Association, and the American Board of Architects. We also had in mind the national examining system for licensing veterinarians in England, which has a long and successful history. We had only ten approved schools then and it seemed like a simple matter. The problems, though, were not as simple as they seemed to be.

A new committee headed by Dean Krill finally dug up some of the old records and a comprehensive plan was brought up to date for a national examining board. It will incorporate memberships from the state examining boards, from the Army, from the Bureau of Animal Industry, from the Public Health Service and some other organizations which are intimately associated with us will have representatives on that board. The A.V.M.A. and the faculties of the different colleges will have a voice in the matter. It looks pretty well rounded out.

The organization of the A.V.M.A. with the constituent associations has been making some strides in the last few years. Many of the state veterinary medical associations have become constituent organizations, always of their own choice. As a result of this, applicants for A.V.M.A. membership must be members of their state organizations.

The membership in the House of Representatives has been standardized to four years instead of two. I think that with this four-year membership, the delegates will take a more constructive attitude toward activities of the A.V.M.A.

We ought to adopt one of the slogans of the American Farm Bureau Federation—"No substitute for membership." If any of you know a man who isn't a member, go out and get him. It doesn't take long. Most of them are willing to come in. All they want is an invitation.

The effectiveness of this organization is governed by three factors. Its cause must be just and right. We have that, I believe. We are in a legitimate business. We are doing good work. We are conserving livestock. The mere propagation of livestock is not enough. We must maintain its health. Veterinarians are of great assistance in both instances, so we are of value to the livestock industry.

We must have a devoted, intelligent and unselfish membership. We qualify for that. I think every person here and every member believes that we do. You know in Indiana the accomplishments that can be secured along any particular line if we lose sight of our own individuality; in other words, keep pushing to a great end. We can accomplish a great deal. We have, we believe, leadership which carries out the policies delegated to it by the membership. If not, then there is always a way of changing that leadership. The method of election of officers in the A.V.M.A. is as thoroughly democratic as is believed to be possible. There may be some additions to it, may be some changes that will go through, but the present means of election has been adopted after many years' experience. When the Association gets still bigger, maybe many other changes will come in. We believe the present method of electing veterinarians to membership is a good one. One can join the Association at any time. It is not necessary to wait for an annual meeting as was formerly the case.

I thank you for the invitation to come here. I have enjoyed this occasion very much. I have a lot of good friends in Indiana and shall make some more, some new ones, as a result of this visit.

Rôle of the Veterinarian in Today's Army

By E. W. YOUNG, Lt. Col., V.C.
Fort Benjamin Harrison, Indiana

ONE still hears people say "What—you a veterinarian in the Army? Why, I thought the army had done away with all their horses!" Not long ago an infantry officer with at least 20 years' service asked me "What on earth do you do with veterinary officers at Ft. Benjamin Harrison? I know that they got rid of their horses before the war started." When such a statement as this is made, either this particular officer is just plain dumb, or we as veterinarians in the army have failed to advertise. I'm afraid the failure is ours, at least, to a certain extent. Our work, as is true with other service units, is usually done behind the scenes. As long as everything goes well, well and good, but if, by chance, something should go wrong, those concerned know where to place responsibility.

The Veterinary Corps has come a long way since 1848, at which time the Congress authorized the hire of veterinary surgeons. From that day until this, the lot of the army veterinarian has constantly improved. True, progress was slow, but provision for the establishment of an adequate veterinary service received special impetus with the advent of the "embalmed beef" scandal during the Spanish-American War.

As an interesting side-light of the "embalmed beef" scandal, there appears in the autobiography of the late Fiorella H. LaGuardia the following, "One of the worst scandals of our entire military history occurred during this short Spanish-American War and made a lasting impression on me, for my father was one of its victims. Corrupt contractors supplied the Army with diseased beef. My father became so ill as a result of eating some of this beef that he had to be discharged from the service. My father died in 1901, a victim of condemned Army meat."

Since that time, with provision made for a full-time army veterinary service, it has accepted full responsibility for the quality and condition of meat and dairy food products supplied the Army. That such service has been a success is indicated by the fact that no serious widespread outbreaks of disease traceable to the issue of unwholesome meat, meat food and products has occurred, and certainly there has been no such scandal as occurred during the Spanish-American War.

Army Veterinary Service in the present-day Army means food inspection and veterinary medicine in relation to human health. Horses have been a minor factor in our army for a number of years. In World War I, with an army of three million men and 475,000 animals, approximately 90% of the 2,234 veterinarians in the service were engaged in work with mounted units, leaving 10% in food inspection. Almost every unit in that War had animals. The mobility of the fighting units depended largely on animals and it was the responsibility of the veterinarian to do all in his power to keep the units mobile. To this veterinarian the care, treatment and prevention of disease of the animals under his care came first, but no doubt he did a limited amount of meat inspection.

In World War II, it is interesting to note that 85 to 90% of all veterinary officers were engaged in food inspection and only 10 to 15% of a total of approximately 2200 veterinary officers were connected with animal activities. A large percentage acted as advisors to the Chinese Armies in India, Burma and China in the care, management and treatment of disease in Army animals.

During World War I, relatively few veterinarians were required for food inspection. The Army was smaller and was concentrated overseas, whereas in World War II the strength was three to four times greater and was scattered all over the world, in climates from torrid to frigid. The ration has improved, as it is continuing to improve even now. The variety is greater, thus making the inspection work more complex. Specifications for animal products prior to and during World War I were very scanty and the requirements poorly defined. Specifications have been and are continuing to be re-written in clear concise language, which leaves no doubt in either the inspector's mind or that of the contractor as to just what is wanted.

The American soldier is the best fed soldier in the world. He had and has a greater variety, a better balanced and a more palatable ration than any other soldier has or ever had. True, there were complaints, but, these

*Presented at the 65th annual meeting of the Indiana Veterinary Medical Association, Indianapolis, Jan. 13-15, 1949.

could usually be traced to logistical difficulties, or lack of facilities to store or refrigerate food properly. Obviously there was little use to send a "reefer" ship of frozen beef, pork, butter, etc., to India, Burma or elsewhere if the food could not be refrigerated after it got there. Eventually, during the last war, almost every area, where there was a concentration of troops, was equipped for the handling of frozen food which, of course, resulted in a considerable increase in variety of foodstuffs.

Perhaps some of you have read in the papers recently of the work being done to improve particularly the field and emergency ration. Canned items, such as ham and lima beans, meat and spaghetti, hamburgers, chicken and vegetables, beef and vegetables, etc., are really tasty items and when combined with other components included in the ration, make up a well-balanced meal. These items are for front-line use and are a far cry from the "corned willy," "gold fish," and "hard-tack" of World War I. Improvement of the ration is continuing and even canned bread is being given a trial.

The Quartermaster Corps is conducting exhaustive research in developing new and special types of rations and in improving all rations in general. This, in turn, makes inspection at time of procurement far more complicated and infinitely more important because, no matter how diligent the research in determining the requirements and how adequate and detailed the specification for rations or special items, it is all to no avail unless a competent fully enlightened inspection service interprets and enforces these specifications while such items are being processed, packaged, procured and delivered.

Food of animal origin represents approximately 38% of the ration. This 38% represents 60 to 70% of the cost and even a higher percentage of the food value. As a class these foods are the most perishable. They are the most difficult to judge for quality and wholesomeness. They are ideal media for the growth of microorganisms, causing spoilage and for those that may transmit disease to man.

It is these types of food which offer the greatest opportunity for exploitation by dilution, substitution or the marketing of inferior or even unsound products. It is a well-known fact that army contracts were once considered by some as a dumping ground for inferior products. There is no doubt that the army veterinary inspection service has corrected this condition with a resultant saving to the government of many millions of dollars.

During the recent emergency period 1939 to 1945, over 27 billion pounds of foods of animal origin were inspected at time of procurement! Of this amount, 5.3% was rejected, which represents approximately 88 million dollars. This seems important from a monetary standpoint, but actually is insignificant in comparison with the benefits derived from the maintenance of an adequate, safe and wholesome food supply for the Army.

It is not news to veterinarians that meat and dairy products inspection is extremely important. You know also that a complete inspection of such products is not now being accomplished. According to a statement by the committee on Food and Milk Hygiene at the A.V.M.A. Meeting in San Francisco, it was estimated that in 1947, more than 40 million pounds of unfit meat went to public markets because of failure of many states and municipalities to provide complete and adequate veterinary inspection at slaughterhouses.

The Army has controlled this by buying meats and meat products from establishments that are supervised by the Bureau of Animal Industry. This, however, applies only in the United States and its possessions. During wartime, the army veterinarian in overseas theatres, was called upon to perform all inspection functions in the absence of the agencies which the American public depends upon to safeguard human health, food, and the livestock industry insofar as they may be affected by animal disease, food-borne epidemics and impure or unsafe foods.

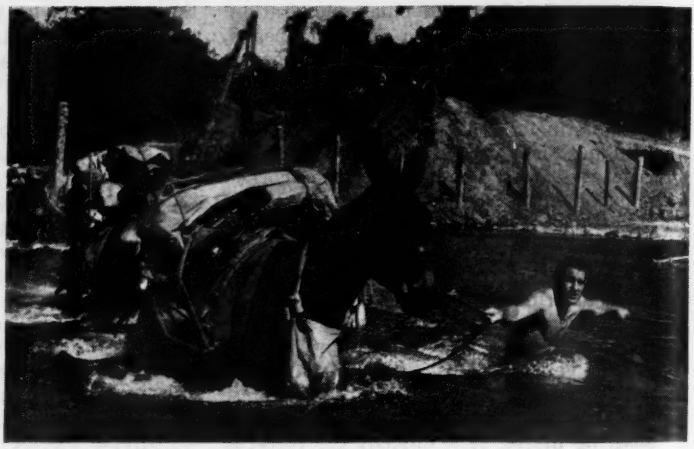
If there are any veterinarians in the room who served in China during the late war, they may have come in contact with some of the abattoirs that were established to furnish fresh meat and poultry to our troops. The army veterinarian did practically everything in connection with these temporary abattoirs —drawing the plans and supervising construction, management, inspections, antemortem and postmortem, delivery of meat, etc. These veterinarians in their antemortem and postmortem inspections found practically every disease that affects food animals. That they did a good job is evidenced by the fact that at no time, as far as I know, was any disease of man, and there were plenty in that theatre, traceable to the consumption of army inspected products.

Some of you may wonder as to the future of professional veterinary service with animals in the Army. That, of course, is hard to answer. The possibility cannot be overlooked that under certain operational conditions, mounted or mule-pack units may again be hastily assembled or pressed into action to meet certain critical situations, as was the case during the recent war. In China and

Burma, countries in which the roads are poor, animals in warfare sometimes become a necessity in order to take advantage of operational conditions. During one phase of the operations against the Japanese in China, 8,200 horses and mules were air-lifted to place them in strategic positions near the front. Not one animal was seriously injured in this air-borne transport. In war, nothing must be overlooked, and certainly provision must be made for the use of animals if the need arises.

War dogs may again be used in the event of a war. The army veterinarian will be held responsible for their treatment in case of disease or injury, and will be called upon as an advisor in maintaining the health of the dog. Then, of course, there no doubt will be pigeons, laboratory tests, experimental and serum-producing animals, as well as large numbers of livestock of various types in occupied territory all requiring the attention of army veterinarians.

The role of veterinarians in the present-day army is not entirely food inspection at origin. We have army veterinarians on duty with military governments in occupied countries, whose function is to recommend and carry out sound policies which lead to prompt organization and mobilization of all veterinary resources in occupied areas to prevent animal plagues from disrupting and destroying productivity in the occupied countries of Europe and Asia. That this is the first war in history, which has not been accompanied or followed by widespread devastating animal plagues, is worthy of note.



Under certain operational conditions mule-pack units may be hastily assembled, as was the case during the recent war

Other tasks lie in fields of training, research and development in connection with problems encountered in food inspection and in connection with animal diseases as they may effect man as well as animals. This includes studies and plans with respect to the newer types of warfare. Atomic warfare is of particular concern because of the immediate devastating effects and more important, because of possible long-range effects on sources of food supplies and food producing and transport animals. The safe and economical disposal of animals and foods exposed to direct or massive delayed radiation, could be a grave problem.

Training and career planning for veterinary personnel parallels that of other services. Officers and enlisted men will receive the same basic and tactical training as other Medical Department personnel. In addition, they will continue to receive technical training at the Medical Department Meat and Dairy Hygiene School and at Army Medical Centers. Selected officers will continue to attend colleges and institutions for training in public health, virology, bacteriology, animal comparative pathology, and other specialties. Others will receive training at colleges and in civilian industry to specialize in meats and meat products, poultry and poultry products, fish and fish products and dairy products with relation to food inspection.

Undoubtedly many of you are aware of the reëstablishment of veterinary R.O.T.C. units in the veterinary colleges in Colorado, Kansas, Iowa, Ohio, Cornell and Pennsylvania. Each of these units is headed by a veterinary officer. The general objective is to qualify graduates of veterinary colleges as veterinary military officers.

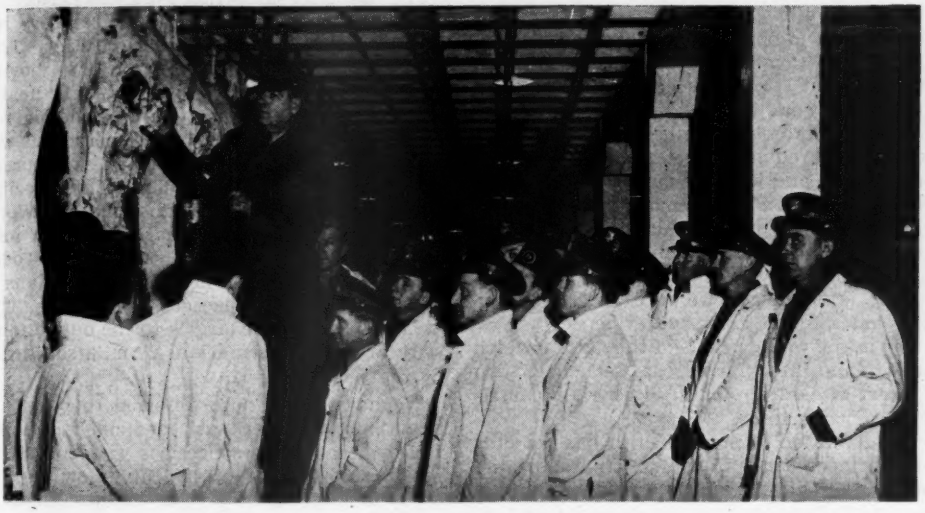
The course is elective and is based on three hours per week (90 hours per academic year) for four years. However, 58 hours constructive credit is allotted for instruction in technical veterinary subjects given by members of the faculty of the veterinary college. The course of instruction is broad in scope and designed to place emphasis on practical application in military and civilian veterinarian pursuits. Military drill and wearing the uniform is not required in the veterinary R.O.T.C. course.

The student is required to attend one summer camp of six weeks' duration. The camp will be held at Fort Sam Houston, Texas.

The benefits derived are priority for commission in the Veterinary Reserve Corps, promotion, veterinary professional improvement and even financial benefits. During the entire period of enrollment in the advanced veterinary R.O.T.C. course an allowance of $27.00 per month is granted. During the six weeks camp an allowance of $2.50 per day is made, plus travel expenses, food, clothing, medical and dental care.

to accept active duty to fulfill the Army's current needs. This is primarily due to the fact that in terms of income the Army pay is not commensurate with that of the average civilian veterinarian. Then, there is the housing situation. A veterinarian, if he has a home, is rather reluctant to give it up and take his chances with the army of house-hunters. It is hoped that the pay situation as well as the housing in the army will soon be improved.

As has been stated, the Corps is critically short of officers and will welcome applications for active duty. The pay isn't too bad, one can



A class in the Meat and Dairy Hygiene school in Chicago. Courses are still being offered veterinary personnel of the Army

If upon graduation the former student becomes a reserve officer, in addition to promotion at regular intervals, he will be entitled to retirement benefits at the rate of 0.5% of the base and longevity pay of the highest grade held by him in the Veterinary Reserve for each year. He will be entitled to 2½% of the base and longevity pay of the highest grade held by him for each year of active military service.

The success of the Veterinary Corps in fulfilling its mission during World War II can, in large measure, be attributed to the civilian veterinarians who served under temporary wartime commissions to augment the small corps of Regular Army officers. The successful accomplishment of the Corps post-war job is jeopardized by a shortage of officers, which has existed for several months and is continuing. A Regular Army Veterinary Corps with a strength of 186 officers is inadequate. It is, or at least has been to date, impossible to secure a sufficient number of reserve officers

live on it, and certainly the retirement benefits that accrue are worthwhile. If any of you gentlemen are interested in acquiring further information concerning entering active duty, or any other phase of the Reserve, please call me at Fort Benjamin Harrison. If I can't answer your question, someone else can.

If you apply for active duty, you will, within certain limitations, have your choice as to the section of country in which you wish to serve. I am also reasonably sure that there are a few foreign service vacancies. If you should desire to serve in Indiana—there are two vacancies in the District. Let me repeat, if you are at all interested, please do not hesitate to call on me or the nearest organized reserve unit.

Before closing, I would like to add that I am indebted to General McCallum, the Chief of our Corps, and his staff, for most of the information that I have given you. He joins me in wishing you success and happiness in the New Year.

Veterinary Practitioners and Community Health*

By JAMES H. STEELE, D.V.M., D.P.H.
Atlanta, Georgia

SURGEON General Dr. Leonard A. Scheele, who is a native of Fort Wayne, Indiana, wishes me to convey his greetings to your meeting here today. He is very much interested in the development of the veterinary public health program.

The title of my paper, "The Veterinary Practitioner and Community Health," is a little ambitious, but I will try to depict some of the background work that we are carrying on in the United States, that will eventually be put into effect through the veterinarians in local communities and will influence the health policies, both of man and animals, in those areas.

The growth of public health in the postwar period has been the result of observations made during the war years, that we are not as healthy as we thought we were. Selective service officials found extensive evidence of poor health in the young people of the nation, which ranged from infectious disease sequellae, such as heart disease, to dental disease and nutritional deficiencies.

The definition of public health has not only listed as its objective the reduction of mortality from disease, but the effective disappearance of morbidity. Freedom from illness and a sense of well-being is the real objective of public health —if these are achieved mortality will most certainly decline.

Veterinary public health can do much to reach this eventual goal of a healthy nation, as it has done in the past. The early contributions of the veterinary profession were in many fields that affect the public health as well as in direct health activities such as meat and milk hygiene. The successful attacks on diseases of food-producing animals insured a supply of animal protein which is so essential to good health. The conquest of Texas fever, pleuropneumonia, blackleg, anthrax, and tuberculosis are some of the most outstanding achievements of veterinary science.

The inauguration of meat inspection more than 40 years ago has assured the nation of a wholesome supply. Today more than 60% of all meat consumed is under the inspection of the U. S. Bureau of Animal Industry. Seldom has any disease in man been traced to this supply except trichinosis, which cannot be determined except by microscopic examination.

The first milk sanitation work was performed by veterinarians who carried on sanitary inspection along with tuberculosis testing.[1] This work proved the need for national bovine tuberculosis testing and, with the public health justification in addition to the economic necessity, the program of bovine tuberculosis was successfully executed. With the widespread adaptation of pasteurization and the decline of the number of veterinarians following World War I, the veterinarian was replaced in milk sanitation by engineers and sanitarians. Today the demand for public health[1] veterinarians in milk sanitation far exceeds the supply. This great demand is due largely to the outstanding work of army veterinarians in milk sanitation during World War II.

We have only briefly referred to past contributions of veterinary medicine to public health because our concern is with the future problems of public health, and how we can assist in their solution. The greatest fields of veterinary public health are:

1 Research
2 Field investigation and application of known knowledge, and
3 Food inspection and sanitation

In the field of research there are many problems that can be attacked only through a team of public health investigators, who represent the thinking in all the fields that make up the biological and medical sciences. Within the U. S. Public Health Service, this has come into being in the National Institute of Health and the Communicable Disease Center. At the National Institute of Health, veterinarians are found in the divisions working on infectious diseases, pathology, tropical medicine and cancer, and in administrative positions.

The field of infectious disease research has two problems which are uppermost at present. They are the encephalitides and rickettsial diseases. The encephalitides include studies on

*Presented at the 65th annual meeting of the Indiana Veterinary Medical Association Jan. 13, 14, 15, 1949.

[1]The first veterinarian of record appointed to a whole time public health position was Henry E. Earl, who in 1880 was appointed expert to the Board of Health of New Brighton, Richmond County, New York.—Veterinary Military History of the United States.

equine encephalomyelitis of the eastern, western and Venezuelan strains in addition to the St. Louis variety, and rabies. All the research in these fields has been focused on the development of an efficacious immunizing agent.

A trichina inspector in the American zone in Germany examining specimens from a carcass of a recently slaughtered pig. The German meat inspection law requires that all slaughtered pigs and other carnivorous animals which are intended for human consumption, which may be hosts of trichinella, must be inspected for the parasite

Dr. Fritz S. Bell, Dr. John Wright, and Dr. Carl Habel, of the National Institute of Health, will shortly publish a report of having isolated the fraction in protein that causes the post vaccinal accident in man, when he receives rabies treatment. This work has been going on for two years and is one of the most substantial contributions in this field. Veterinarians also have benefited from this work inasmuch as they have developed an antigen which we feel is an effective immunizing agent for prophylactic treatment of dogs and other animals.

The rickettsial disease of most concern to all at present is Q fever. The disease is caused by a rickettsiae known as *Coxiella burneti,* an organism of 600-800 mu in size which has all the characteristics of a rickettsia except that it can be transmitted in nature without an insect vector. It is a tenacious microörganism that can survive under conditions that are unfavorable to most virus and rickettsia agents. The problems in solving the epidemiology and control of this disease are the determination of the epizoötiology in cattle and other ruminants and the development of effective therapy and immunizing procedures. This problem is a perfect illustration of a veterinary public health responsibility. Q fever is a disease of man that has an apparent reservoir in cattle, sheep and goats. In these animals it produces no symptoms or physiological changes that would cause it to be of any economic concern. The veterinarian in public health finds this is an excellent opportunity to contribute in the control of human disease. A problem of this kind raises the question, are there other unknown inapparent disease reservoirs in animals that we do not recognize that are the cause of similar atpyical pneumonias or pneumonitis in man. To encourage our speculations another rickettsia has been isolated from cattle in the southwest. This agent has not been incriminated as the cause of disease in man or animals up to the present. Another rickettsia has been isolated from ticks in the Gulf Coast States which has not been found in man or animals either.

The first one I referred to is similar to the Rocky Mountain spotted fever organism. There has been a report from Brazil recently that this organism has been isolated from the udder of the goat also. The second one that we speak of is found only in the lone star tick and is referred to at present as a disease of ticks, but it does not appear in animals or man so far as is known.

The studies in comparative pathology are under the direction of a veterinary officer. The unit acts as a central comparative pathology laboratory for the various research divisions in the National Institutes of Health. Their basic studies in addition to their services to other units is the investigation of spontaneous diseases of laboratory animals. Spontaneous diseases are those which arise from natural causes in animal colonies. They may be infectious, neoplastic, parasitic, or nutritional. Whatever they are, they often interfere with research problems, or are sometimes reported as being due to the research challenge agent. In the latter case, they may be the source of considerable embarrassment. The comparative pathology section also assists the field investigation units of the Veterinary Public Health Division in the Communicable Disease Center.

In the field of cancer research a veterinary unit will be founded in the next few months to study the pattern of neoplasia in domestic animals, especially fowl. These studies may give clues to those working in the field of cancer in man and be an invaluable contribution to the health of man.

The researches in tropical medicine naturally include investigation of many parasitic diseases that are found in animals and man. These studies have always been closely asso-

ciated with veterinary medicine, and some of the outstanding workers in this field have held veterinary degrees.

The second phase of veterinary public health is field investigation and control, which is a division of the Communicable Disease Center in Atlanta, Georgia. Here are headquarters for all field disease investigations and control. Other divisions in the Communicable Disease Center are epidemiology, entomology, engineering, technical development and laboratories. These units all act as a team along with the Veterinary Division in attacking public health problems. The Veterinary Public Health Division consists of four branches: (1) Rabies Control (2) Investigations (3) States Services and (4) Special Projects. In addition there is an administrative headquarters. All branches except the Rabies Control are located at Atlanta, Georgia. The Rabies Control branch is at Montgomery, Alabama, where it occupies the former Rockefeller rabies laboratory that housed the work of Webster, Leach and Johnson. These men built a very firm foundation for the rabies eradication work which the Veterinary Public Health Division is executing. The Rabies Control branch has two programs, one to investigate and determine the efficacy of all canine rabies vaccines, and the other to put into effect in every state a rabies eradication program.

The investigation of rabies vaccines has not, so far, revealed any vaccine that is superior to the generally used phenolized rabies vaccine. There are some newer products being studied, but no opinion can be expressed until the completion of a one-year study on a series of 200 dogs. In the field the rabies eradication program is based on four premises: (1) the removal of all stray dogs in the community; (2) the immunization of all resident dogs; (3) the reduction of wild animal reservoirs; and (4) the education of the community to want to eradicate the disease.

If we can put these beliefs into action in any community or state, we can eradicate rabies in that area. The veterinarian in every community is the keystone on which the program will be built. He has the influence and professional knowledge necessary to put into effect this simple public health program. There is no need for 40,000 or more persons to take antirabies treatment annually, or for the nation to accept the $10,000,000 loss, that is attributed to rabies every year. The eradication of rabies is the number one objective of the Veterinary Public Health Program, and with your support and active assistance that goal can be reached. The Rabies Control branch is also interested in closely related problems such as the differential diagnosis of encephalitides which simulate rabies.

The Special Services branch will assist in a study of the epidemiology and control of encephalomyelitis in the midwest. This project will be a part of a larger study which will investigate all potential reservoirs of encephalitis and look for new etiological agents of neurotropic diseases and their vectors. Other special projects include assistance to the Alaska Health and Sanitation Project. Under this project a team of veterinary scientists will investigate the animal disease reservoir which is of public health concern, and also what animals could act as a reservoir if new diseases were introduced. The most recent development in the Special Services branch is veterinary public health education. A veterinary officer has been assigned to the Harvard School of Public Health to assist in training veterinarians and other public health workers in veterinary public health. The veterinary candidates for public health degrees will study special problems related to veterinary medicine and public health. Another course of a general character will be given for all public health students, to acquaint them with the problems of veterinary public health and why the veterinarian is essential to a well-balanced, public program. Other members of our staff have been appointed to faculty positions at medical and public health schools to lecture on animal disease problems of public health importance. Future special projects will deal with the new technical problems of the advancing sciences as they relate to veterinary public health and the wider field of public health.

The Investigation Branch has under study, in coöperation with state health departments and other divisions of the Public Health Service, brucellosis, salmonellosis, histoplasmosis, creeping eruption, psittacosis, avian pneumoencephalitis, taeniasis, and Q fever. These projects are to determine how these diseases are spread to man, what reservoirs other than animals may exist, and what control measures can be put into effect. The assistance of the state university's veterinary research stations, state veterinarians, U. S. Bureau of Animal Industry, and general practitioners have been invaluable in these studies.

The fourth branch of the Veterinary Public Health Division is the State Services. Under this program veterinary officers are assigned to state health departments to assist them in establishing programs. The duration of these assignments are about two years, during which the state health department employs a veterinarian to work under our guidance until he

is acquainted with the problems. Then he is sent to a graduate school of public health by the state health department. While he is away for one year the Public Health Service veterinary officer develops the program and on the return of the state's public health veterinarian, he assumes responsibility, and we retire after a five or six month period.

The examination and pasteurization of milk is of great concern to the Public Health Service. Milk and meat inspection are important parts of the veterinary public health program

Pictured is a control laboratory for a fluid milk plant: (1) Mojonnier tester. (2) Analytical balance. (3) Centrifuge for the Babcock test

A well equipped and well managed control laboratory is an essential part of a properly operated fluid milk plant

Earlier I have mentioned that food sanitation was the third sphere of veterinary public health activity. Food sanitation is under the direction of the Sanitary Division, and the veterinarians assigned to this function are under their direction. Recently a division of the responsibility of this activity has been effected. Veterinary Public Health Division will assume responsibility for the investigation of food-borne infections of animal origin. Our field men will also assist in developing meat and poultry inspection programs, in states that have no such programs.

The need for the extension of pasteurization to all milk products in every state and community in the country is becoming evident from the disease studies of our field staff, and every state is being encouraged to enact statewide pasteurization laws similar to those of Michigan, Utah, and Colorado. The pattern of state meat and poultry inspection is being developed in Colorado and will be reported on at a later date.

Summary

1. Public health has benefited from the contributions of veterinary medicine in the control of animal diseases.

2. The modern concept of public health requires the services of veterinarians in research, field investigation, disease control, and food sanitation.

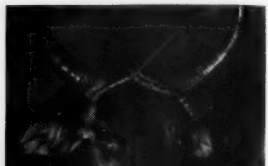
3. The Public Health Service has established veterinary units in the fields of research, communicable disease control and food sanitation.

4. The Veterinary Public Health program of the Communicable Disease Center carries on the investigation of various infectious diseases in coöoperation with the state health departments. The eradication and control of these diseases is always the goal, among which the eradication of rabies is a principal objective.

5. The pasteurization of all dairy products obtained only from healthy animals and the professional inspection of all meat, poultry, and fish products are the objectives of the veterinary food sanitation program.

The Outbreak of Foot-and-Mouth Disease in Mexico*

By GEORGE W. GILLIE, D.V.M.
Fort Wayne, Indiana



IT IS a happy privilege to come back to Indiana again. It has been a long while since I attended one of these meetings—10 years. I had the opportunity of serving for 10 years in the United States Congress, perhaps in one of the most important periods of our history. I am glad to have had a small part in that work.

It is good to see old friends again and Mrs. Gillie and I have enjoyed this visit immensely. She has renewed old acquaintances like myself, so I say again we are very happy to be back here.

Yesterday I noticed the Ladies' Auxiliary playing an important part in this meeting and I am very glad to see that because, after all, the women assist us a lot in the practice of veterinary medicine. They do a lot of the work and I commend them for it.

This morning I want to talk to you a little about the foot-and-mouth disease situation. Of course, it is changing all the time, but I would like to give you some of the important points as of about one month ago.

It isn't necessary to say anything about the past history of the foot-and-mouth disease nor of its dreadful effect on the livestock industry of any country where it becomes prevalent. You know about that.

History of the Mexican Outbreak

The question before us is what are we going to do about the outbreak that has established itself in Mexico? I want to review just enough of the history of that outbreak to bring us up to date and to give us the necessary background for an analysis of the existing situation in Mexico. Here are the facts as we know them.

December 26, 1946, the Bureau of Animal Industry, in Washington, received word that foot-and-mouth disease existed in Mexico. The report was made by veterinarians of our Bureau who had been sent to Mexico, at the invitation of the Mexican government, to assist in the diagnosis of a suspected outbreak.

It is assumed the disease was brought into Mexico by zebu bulls from Brazil, which had been imported into Mexico in violation of the Mexican-United States sanitary treaty. Note that I say it is "assumed" the disease came in by way of these Brazilian bulls. There are rumors to the contrary in Mexico.

According to our reports, however, the disease was first discovered in a herd near Vera Cruz in which one of these Brazilian bulls had been placed. The bull did not have the disease at the time of the first outbreak.

As soon as the disease was reported, the Mexican-United States border was closed and veterinarians from our Bureau of Animal Industry began informal coöperation with Mexican authorities in laying plans to combat the outbreak.

It was discovered that the disease had already spread to practically all the states of central Mexico—16 different states—from the Gulf to the Pacific. It wasn't established everywhere throughout those states, but there were local centers of infection scattered clear across central Mexico.

Quarantine lines were set up in an effort to confine the disease. These were manned by the Mexican Army. There were two kinds of quarantine lines—the permanent lines north and south of the generally infected area, to keep the disease within that general area—and the more or less temporary lines which were established within the generally infected area to try to keep the outbreak localized.

Authority Given and Money Supplied Without Delay

Early in February, 1947, the Department of Agriculture came to the Congress with a request for authority and for money to coöperate with the government of Mexico in efforts to stamp out the disease. That request was promptly granted.

The Committee on Agriculture of the House had already set up a subcommittee on foot-and-mouth disease, of which I had the honor to be chairman. The Senate Agriculture Committee had set up a similar subcommittee with Senator Bushfield as chairman.

*From an address at the 65th annual convention of the Indiana Veterinary Medical Association, Indianapolis, January 13, 14, 15, 1949.

With these two subcommittees already on the job, it was only a matter of days from the time the Department of Agriculture came to the Congress until we had provided them by law with both the legal authority to coöperate in Mexico and the money they requested to start the job. Incidentally, I may say that there has never been a time since this outbreak was first reported when the program has been held up for one minute by the failure of the Congress to take prompt and effective action in providing both funds and authority.

By the first of April, 1947, American men and equipment were moving into Mexico. By the middle of June the slaughter and burial program was in full swing. By the end of November, when the slaughter program was stopped, more than 500,000 cattle had been slaughtered. In spite of this, the disease had continued to spread within the infected area.

The Slaughter Program Fails

It was still confined to the same general area in central Mexico, but it had flared up in scores of new communities and in new herds within the area. When the program was launched, Mexican and American officials estimated that it might be necessary to slaughter some 1,500,000 to 2,000,000 cattle in order to eradicate the disease. By the end of November it had become obvious that it would be necessary to kill and bury virtually every cloven-hoofed animal in the infected area. That would mean the destruction of five to six million cattle and perhaps an equal number of sheep, goats, and hogs.

That would mean the killing of about one-half the livestock population of Mexico. A complete eradication program would have meant that whole states would have been left, for a time at least, with no livestock whatsoever—no cattle, no hogs, no sheep, no goats, no work oxen.

The Mexican government decided that it was impossible to carry out an eradication program of that magnitude—impossible economically and impossible politically. It was a decision with which I don't believe we can quarrel. I doubt seriously if we could carry out an eradication program of that magnitude in the United States.

Naturally, operations in Mexico can be carried on only with the approval and coöperation of the Mexican government. So when that government decided that the situation had reached a point where it was impossible to continue with the slaughter program, our officials had no choice but to comply. We were left with two alternatives—either continue in Mexico with a program acceptable to the Mexican government and to us—or withdraw from Mexico and prepare to fight the disease in the United States.

That was the situation with which we were faced when we opened our hearing in Washington December, 1947.

New Program and a Chance of Success

The subcommittee on foot-and-mouth disease made seven recommendations, but the basic policy—the only basis on which I believe it is worthwhile to continue in Mexico—is stated in recommendation No. 2. This recommendation reads:

"It shall be understood definitely by all participants that the program now under consideration is not an abandonment of the effort to eradicate foot-and-mouth disease from this continent but is merely a postponement of that effort until it can be undertaken and accomplished in a manner which is more acceptable to the Mexican people and tolerable to the Mexican economy."

In Mexico we have met a rousing defeat in our first battle. But we have fallen back in good order—our lines are intact—and we are ready to give battle again along lines that we believe will bring us eventual victory. The strategy of our campaign from here on is outlined in the first recommendation of the committee. Let me read it:

"The campaign against foot-and-mouth disease in Mexico shall be conducted on the following basis:

First, an all-out effort by both countries to hold a quarantine line immediately north of the present infected area, including a sterile zone as wide as possible south of such line in which all infected and exposed animals will be subject to immediate slaughter and burial, in order to prevent spread of the disease into northern Mexico and the United States.

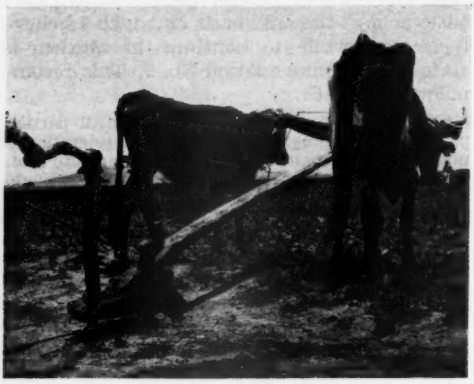
"Second, extension and enlargement southward of that sterile zone as rapidly as circumstances will permit, with vaccination being employed by the Commission only as an adjunct to quarantine."

There is the plan that we believe is the best that can be worked out under the circumstances. First, hold the quarantine line north of the infected area. Second, work southward from that line eradicating the disease—by slaughter and burial—county by county, township by township, as rapidly as we can. And in the meantime—and I think this is very important—put our best available scientists to work on the job of trying to find a scientific remedy for this situation.

Why do I think this plan holds our greatest hope of success? Why do I think this quarantine line can be held when we have always felt that it is virtually impossible to hold a land quarantine against foot-and-mouth disease? Let's analyze the situation, considering not only the probable results of our future moves, but the factors that contributed to our earlier failure.

Failure of Slaughter Plan Inevitable

First, what were the factors that contributed to the failure of our first eradication program? The first factor that contributed to our downfall, I think, was the difficulty of the terrain in central Mexico. A glance at a road map of Mexico will show you that there are very few paved highways. If you have



Each family has a yoke of oxen, which with a wooden plow, is operated by hand on a small farm

traveled through central Mexico, you know that in most sections there are not only no highways, there are no roads whatsoever. Mexico is still a primitive country, except for the large cities. Out in the country 99% of the travel is on foot or on the backs of burros. Roads are not needed for that kind of transportation. In most rural areas of Mexico, roads as we know them, simply do not exist. The lack of roads hurt our campaign. It rendered transportation of our heavy digging and disinfecting equipment difficult, if not actually impossible. In a campaign where we were attempting to operate simultaneously and at high speed over an area 450 miles long and 250 miles wide, the difficulty of the terrain presented an almost insurmountable handicap and, by itself, might have been sufficient to beat us.

A second cogent reason for the failure of our campaign, as I see it, was the character of the agriculture in the infected area. In the main, central Mexico is an area of small farms. There are a good many dairy herds, principally around Mexico City. There are a few large ranches, mostly over in the area toward Vera Cruz. But in general, central Mexico is a land of small villages, small farms, and small landowners. The typical farm contains only a few acres. It is operated by one man and his family with a yoke of oxen. Every family has, besides its oxen, its goats and probably a milk cow and maybe a hog or two.

Those in charge of the eradication program found that it was almost impossible to clean out an area and get all the susceptible animals. They could get most of them, yes. They would get oxen by the score, goats and sheep by the hundreds, some milk cows, and some hogs. But a milk cow can be hidden in the woods. A hog or a goat can be put under the bed or on top of a flat-roofed adobe house and be well out of sight. Our men would kill everything in sight, cover the pit, and come back a week later to find animals by the score placidly grazing on the very ground they had cleared. Hiding animals out when the eradication squad came around, or driving them over the mountain to leave with cousin Manuel in an uninfected valley was, of course, merely an indication that José, the average Mexican farmer, simply didn't understand what the campaign was all about. He hadn't been thoroughly sold on the program. He didn't understand why he should coöperate 100% with the government men who were coming around to kill his animals.

Basically, lack of coöperation on the part of the Mexican farmers themselves was the one big reason for the failure of the slaughter campaign. With their full coöperation the other difficulties might have been overcome. Without it I don't think the job could have been done even if there had been no other handicap.

In some places this lack of understanding and coöoperation on the part of the Mexican farmers merely took the form of hiding out some of their animals, or failure to report an outbreak. In other places there was open and bitter resistance to the campaign.

Part of this was due to mere lack of information, and I don't think any of us realized when this program was started how extremely difficult it was going to be to get information about the program to the Mexican peons. Those little farmers don't have radios, they don't have newspapers. Most of them neither read nor write, and many don't speak Spanish. Most Mexican farmers are Indians and Spanish is to them a foreign language, which they neither speak nor understand.

Those of you who have had experience in trying to get American farmers to coöperate in the eradication of foot-and-mouth disease or in any similar campaign where you had no difficulties of language or illiteracy to contend with will understand, I think, the difficulty of trying to convince unlearned Mexicans that they should coöperate 100% in this program.

Mistakes of Eradication Forces

In addition to these difficulties, however, there is no doubt in my own mind but that poor public relations on the part of those conducting the campaign also contributed to the lack of coöperation among the farmers. I don't mean poor publicity, I mean public relations in its broadest sense.

In my opinion an insufficient effort was made to reach the farmer by word of mouth education, by working through the village mayor and political boss, and through the parish priest. I think a little more careful attention to this kind of an educational program in communities where an eradication program was scheduled would have helped. But I doubt if it could have been carried out simultaneously over the tremendous area over which the disease existed.

On its visit to Mexico the Congressional subcommittee saw other examples of poor public relations. We saw animals being killed with a

Sometimes it was weeks after the slaughter of his yoke of oxen before they were replaced by the mules promised him

.22 calibre pistol. At one place we saw them killing about 500 cattle, and throwing them into two pits. I'll bet there were a thousand people around there watching the spectacle. It was a Roman holiday—an excellent way to spread this disease. The residents of the whole community were surrounding the pit, including, of course, the owners of the animals that were being killed. We saw dozens of animals half dead, writhing in pain while they were shot time after time with that puny little weapon. Those animals were dear to those people. From long association many of them become almost like members of the family. When an account of scenes like that spread to the next village, it didn't contribute to an enthusiastic welcome when the eradication squad reached there.

Failure to have mules on hand to replace slaughtered oxen was also poor strategy. We saw farmers whose oxen had been killed six or eight weeks previously who were still waiting for the mules they had been promised. In the meantime, their unplanted fields were growing up in weeds, instead of corn and beans to feed the family the coming winter. That sort of thing didn't make the farmer any more coöperative.

Political Barriers

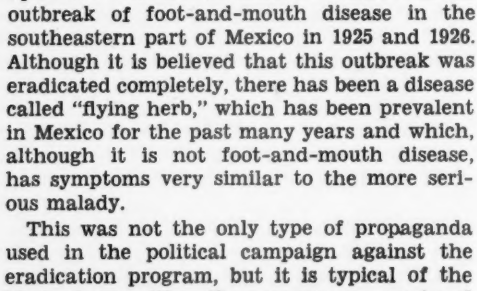
Another thing that turned out to be an important factor in determining the Mexican farmers, attitude toward this campaign was politics, just plain old politics. They have politics in Mexico just as we have in this country And just as in the United States, when there is a party in control of the administration, there are one or more parties who are out and would like to get in, and who seize upon every opportunity to make political capital out of the problems faced by the administration. Just as in this country we have seen high prices, rationing, and similar problems seized upon by opposition political parties in an effort to embarrass their opponents politically, so in Mexico the campaign against the foot-and-mouth disease was used by political parties of the opposition to make political capital and to discredit the administration. Communists worked extremely hard to stir up discontent and foster antagonism during this campaign and that, too, had a great influence on making our problem more difficult.

As in this country, this political propaganda was carried on through every medium, through the radio and press and in a word of mouth "whispering campaign" in the rural areas. In Mexico the whispering campaign was particularly effective.

An interesting rumor which was started and spread by those trying to make political capital of the situation was the report that foot-and-mouth disease was not new to Mexico, but had existed there for a great many years. "This is not a new disease," the peons were told. "The affliction they call foot-and-mouth disease is the same as that disease with which you are all familiar, the 'flying herb,' which you have had among your cattle for many years. This whole campaign is merely a trick on the part of the administration and their Yankee friends to destroy the agricultural economy of Mexico."

Thus ran the argument advanced by those engendering political opposition to the program. They brought out some evidence to support their propaganda. This point of view was presented to the committee by one of the witnesses at our hearing. There is enough factual basis for the contention to permit this kind of argument to have considerable effect upon the farmers of Mexico. There was an outbreak of foot-and-mouth disease in the southeastern part of Mexico in 1925 and 1926. Although it is believed that this outbreak was eradicated completely, there has been a disease called "flying herb," which has been prevalent in Mexico for the past many years and which, although it is not foot-and-mouth disease, has symptoms very similar to the more serious malady.

This was not the only type of propaganda used in the political campaign against the eradication program, but it is typical of the kind of opposition the program encountered in certain places, and there is no doubt that this opposition had a considerable effect in preventing the all out coöperation of the Mexican farmer.



A Mexican cow with udder affected by foot-and-mouth disease

Strangely enough, the disease itself played into the hands of those opposed to the program and made more difficult the job of trying to induce the unlearned Mexican farmer to coöperate with the eradication campaign.

The disease in Mexico is caused by the type A virus and is at present a remarkably mild form of the disease. Since it is caused by a virus, it is impossible to tell when it may become hotter and more malignant, as virus diseases can do almost overnight. Up to the present time, however, there is no denying that the disease has been present in Mexico in a rather benign form. The mortality rate among cattle has been extremely low. Even calves and small animals have recovered from the disease. Recovery among older animals seems to be virtually complete when the disease has run its course, and in many cases even milk cows are not too seriously affected. The disease has been present to only a slight degree in hogs, goats, and other susceptible animals.

Factors Contributing to Success of Present Plan

Now let's turn to an analysis of our revised strategy. Why do I think that the program the committee outlined now has a chance of success where our previous program failed? There are two important reasons. First, the scope of our activities will be much more limited. Obviously, one of the things contributing to the downfall of the first program was the very size and scope of the undertaking. Second, many of the factors which worked against us in our original program will be working in our favor in the strategy we have outlined for the future. I will mention a few of these factors as we try to analyze the situation with which we are now faced.

Let's answer first the basic question: Why do I think we can hold the quarantine line north of the infected area when history indicates that no land quarantine has ever been 100% successful against foot-and-mouth disease? I hope that I am not indulging in wishful thinking, but I sincerely believe that if both countries work together, as I believe we will, to maintain this quarantine, the line can be held.

In the first place, the difficulties of terrain, the lack of roads, and other transportation facilities, and the geography of the country itself seem to me to be in our favor in efforts to hold this northern quarantine line. Where these factors worked against us under our original program, I believe that they will be working for us under the revised program.

I believe that the agricultural economy of the country, which worked against us in our earlier program in the manner I have described, will be all in our favor in our efforts to hold this quarantine line. As I have mentioned, central Mexico where foot-and-mouth disease is now established, is a land of small farms and many small villages. The farmers are poor and usually own only a few animals each. In that part of the country there are almost no ranges and there are very few beef cattle produced. North of the quarantine line, on the other hand, we have the beef cattle and open range area of Mexico. Some of the best range land on the North American Continent is in northern Mexico. There are also some of the largest ranges in the world and some of the finest herds of beef cattle. In

contrast to central Mexico, the cattle in the northern part of the country are primarily those in large herds belonging to wealthy and highly educated land owners who are fully aware of the menace of foot-and-mouth disease. In contrast to the small farmers of central Mexico, those in northern Mexico are 100% behind the program to control and eradicate this disease. The big ranch owners in that part of the country have been most active in working to make this program a success.

Most important in holding the quarantine line, however, is the fact that this will not be a mere line drawn on a map nor a mere single row of guards blocking highways at one point. South of the quarantine line there is to be a sterile zone, which will be as wide as practicable. In some places it is 50 miles wide, some places 25, and some places only 10. The quarantine line is now in many places forty or fifty miles north of the nearest infection. At no point, as far as I am aware, is the disease actually existent right up against the quarantine line. In other words, there is a sterile zone already in existence for some miles south of the present quarantine line. This area, now disease-free, will be maintained and guarded by a second quarantine line to the south of that disease-free area. The sterile zone line has already been shifted south four times. In the beginning this disease was 300 miles or some such distance from the border, and now it is some 400 miles from the border. That shows they are making progress. Every effort will be made to keep the disease from entering this sterile zone and any outbreaks which do occur there will be immediately eradicated by slaughter and burial. Up to this time there have been some 7000 cattle killed in this sterile zone. If this part of the program is continued, it will prevent the disease from approaching within the immediate vicinity of the quarantine line, so that there will be almost no danger of local traffic carrying it across.

As it becomes possible to resume eradication operations, these operations will be conducted so as to push the sterile zone continuously further and further south.

Knowing that our public relations have been poor in the past, we will see that the groundwork is laid carefully for the county-to-county eradication program that we will carry out in the future. The farmers in the area concerned will be solidly sold on the program before it is undertaken. In other words, in conducting this new campaign everything must be done to demonstrate dramtically to the Mexican farmer that it is to his advantage to have this disease eradicated from his community. By the time this has been done in two or three or a half dozen communities, I believe we will find the job of education becoming progressively easier, so that as we move farther south into the disease area we should have less and less trouble obtaining the coöperation that is so necessary.

That, gentlemen, is the strategy on which we expect to proceed in continuing this fight against foot-and-mouth disease. I have analyzed as best I can the factors which I believe contributed to our earlier failure and those which, it seems to me hold out much encouragement for the success of our new program if it can be prosecuted as we have recommended.

Foot-and-Mouth Disease Research Planned

There is one other important factor which I have not mentioned. That is the factor of research. Our committee recommended an intensified and greatly expanded program of research into the control and eradication of this disease, and I am sure the Bureau of Animal Industry intends to embark on such a program. I am sure they will find improvements that can be made in our present methods. I am hopeful that they will make such progress that even before we have eliminated the disease from Mexico in the manner I have outlined they will have found some new method which will greatly facilitate the work.

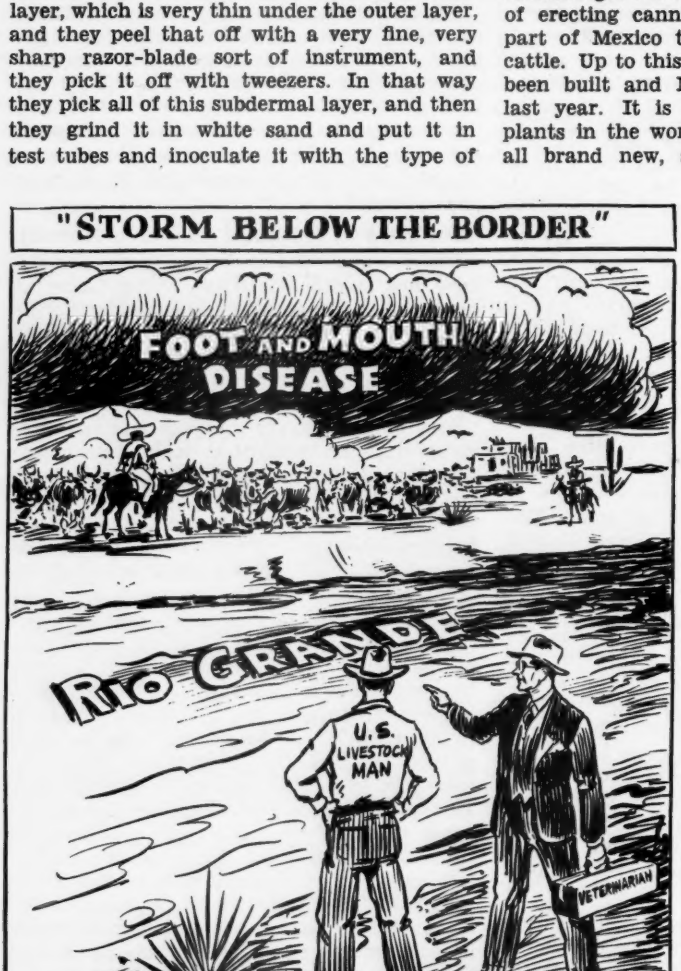
Last year our congressional subcommittee introduced a bill for the erection of a scientific laboratory, and we got an appropriation in the House of some 50 million dollars for that work, but it failed to pass the Senate—perhaps because it was an election year, a campaign year, or something. We found a suitable location on an island in Narragansett Bay, just ideal for this sort of a program. This year the measure will be introduced again to see if they can't get this program started. The plans for this reasearch laboratory provide for 50 acres with a high fence around it. They will have all the latest equipment. When an animal is taken in there, he will never see the light of day again. All the work will be done by artificial light and all the pens and all the exercising yards will be covered. It will be one of the finest laboratories that I have ever seen.

When I went back to Washington last December, I saw a picture at the Bureau that had been taken in Europe of the new method of procuring virus. In Mexico they buy the vaccine animals in northern Mexico and take them into central Mexico to produce the vaccine. That is a rather expensive program. Each animal produces about 400 doses of vaccine.

I think it was in Denmark that they found a better way to procure this virus; that is, they buy just the tongue of an animal from the slaughterhouse. They hang it up on a rack and then with a very sharp knife they cut the outer layer of the tongue off and then pull that down and pick up this subdermal layer, which is very thin under the outer layer, and they peel that off with a very fine, very sharp razor-blade sort of instrument, and they pick it off with tweezers. In that way they pick all of this subdermal layer, and then they grind it in white sand and put it in test tubes and inoculate it with the type of virus that they are using in Mexico. After they get through with that tongue, they sell it back to the butcher again. It doesn't cost much to make vaccine that way. If it proves successful we shall be able to produce vaccine pretty cheaply.

Meat Canning Plants

As I stated there are some of the finest cattle in the world in the northern part of Mexico. In 1947 they couldn't get rid of their cattle crop because of our border quarantine. In 1948 another crop was there and they couldn't get rid of that. So we set up a plan of erecting canning plants in the northern part of Mexico to take care of these extra cattle. Up to this time nine large plants have been built and I visited one in Chihuahua last year. It is one of the finest canning plants in the world, no doubt about it. It is all brand new, all been built by Mexican money, and by U. S. labor and equipment. It is the finest packing plant that I have ever seen, anywhere. It is all modern in every particular, electric trains and all that sort of thing. It is divided into two parts. One is the canning and the other the packing plant.



Courtesy American Foundation for Animal Health

The foot-and-mouth disease problem is not solely a problem of the Southwest. It is an equally serious threat to the dairy industry of Wisconsin, the Northeast, and the West Coast. It is a threat to hog producers of the corn belt and to the cattle feeders of the Middle West. It is a threat to every farmer in each of the 48 states, who owns a cloven-footed animal. It is also an economic threat to consumers as well as to business and industry everywhere.— CLINTON P. ANDERSON

President Dobson: Do the Mexicans object much to the vaccinations?

Doctor Gillie: No, extensive publicity seems to have convinced them that this procedure is best for their livestock industry.

D. M. Campbell: First I wish to compliment the speaker on his remarkably informative address on the foot-and-mouth disease outbreak in Mexico. He has given us far more information, in a single message, about that unhappy occurrence than it has been possible to obtain from official sources in the two years since the outbreak was first reported.

At the annual meeting of the U. S. Livestock Sanitary Association in Denver, in October, there was a sort of field day on foot-and-mouth disease. General Johnson and Judge Flores, the Co-director and the Director of the International Commission, both were there and addressed the meeting. A number of Mexican veterinarians also were there and spoke briefly. Some cattlemen also attended the meeting. They painted pretty much the picture that was shown by Doctor Gillie—perhaps a little more rosy.

The men who are working with it now are very enthusiastic about the vaccine they have. They have tested practically all of the foot-and-mouth disease vaccines that are made anywhere and they think the vaccine they are making possesses certain advantages over all others. The speed with which production of vaccine has been stepped-up in the Mexican laboratories is remarkable. From the start of 9000 doses in June, production has increased to 1,750,000 doses in December.

As Doctor Gillies said, the animals used in making the vaccine are purchased in Northern Mexico, and as it is expected about 100,000 will be used for this purpose during 1949, it supplies a market for about one-fifth of the number of cattle formerly exported to the United States. The remainder of the surplus cattle in northern Mexico are marketed at the canning plants mentioned. The Commodity Credit Corporation purchased 50 million pounds of this canned meat during 1948. Unfortunately, it was able to sell only about 24 million pounds. The C.C.C. has engaged to purchase 140 million pounds in 1949.

The disease had existed in Mexico, we now have reason to believe, at least six weeks and probably longer, possibly about a year, before it was reported to the Bureau in Washington. There is little movement of cattle in central Mexico, and we are at a loss otherwise to account for the wide-spread infection that existed when the disease was reported. Those zebu bulls that were imported are still regarded officially as having brought the disease to Mexico, but many think a large shipment of Brazilian cattle that were surreptitiously imported about a year earlier were the culprits.

Doctor Gillie spoke of the coöperation of the cattle industry in northern Mexico. As he told you, that has been excellent from the beginning. Before those zebu bulls were landed the cattlemen of northern Mexico subscribed a fund of one million dollars and offered it to the importers if they would take the bulls back to Brazil. But the importers thought they could make more than a million dollars by sending them in to the United States, through Mexico, and they did send some of them into this country. We were just lucky.

Sorry

Through an oversight the name of the writer, Dr. G. W. Rawson, Summit, N. J., was omitted from "The Bite of the Shrew" in the April issue, page 176.

It is not important, but at least some South American countries are given a very different story about the Mexican outbreak of foot-and-mouth disease than the one we get. *La Res*, a fine Argentine livestock magazine, sympathizes with Mexican cattlemen because of the loss of their U. S. market which the quarantine has caused them, and praises the efforts of the Mexican government to get rid of the disease. The assistance given by the United States is not mentioned.

Perhaps the Mexican government is not going to come out of this outbreak of foot-and-mouth disease too badly off. Its principal contribution has been the quarantine guard that it supplies, which is the regular Mexican army which they have to keep and feed and pay anyhow. The United States furnishes the transportation required to move the soldiers from place to place, and now, as Doctor Gillie told you, the Mexican government has imposed an export duty of 15% on the canned meat which the Commodity Credit Corporation purchases. Since its commitment for 1949 is 140 million pounds the 15% duty may amount to some seven or eight million dollars!

I think more highly of the vaccination program than Doctor Gillie does. European veterinarians who have employed vaccination in foot-and-mouth disease outbreaks for a decade are enthusiastic about it. The vaccine is no longer an experimental product. It works. If results are not satisfactory, the fault appears to derive from the way it is used. Both General Johnson and Judge Flores impressed me as able men. They have good technical advice and I have no doubt will carry on the vaccination program in an approved manner.

Management of Bovine Sterility*

By J. W. CUNKELMAN†, D.V.M.
Fort Dodge, Iowa

THERE are so many aspects to the subject of bovine sterility that it is possible to touch on only one or two of them in a discussion of this kind. Sterility and the various reproductive disorders may be caused by genetic factors, anatomic malformations, physiological irregularities, infections, and nutritional deficiencies. Recent reports indicate that the age of the animal and season of the year are factors to be reckoned with when considering the conception rate of large groups of animals. These variations in the cause of sterility make it imperative that adequate diagnostic procedures be resorted to before rational treatment can be prescribed. It is no secret that a large part of our bovine population, suspected of being sterile, have been made to run the gauntlet of treatments, which, in many cases, were not preceded by an earnest attempt at diagnosis, nor by controlled experimentation demonstrating their worth. This is partly due to the dearth of bona fide information on the subject as well as to popular demand for certain fad treatments and to the reluctance or lack of time, on the part of some practitioners, to do sterility work.

The general acceptance of the practice of artificial insemination has stimulated much research on the problems of production and efficient use of high quality semen. The next problem has been that of reasons for the failure of conception in individuals or herds where the semen of known quality is used. This has resulted in considerable demand on practitioners for a type of service which has not always been available.

A review of sterility treatments and practices for the past two or three decades shows that there has been a tendency to emphasize certain treatments without particular reason. The use of various agents in the form of a vaginal douche was a popular treatment for brucellosis at one time. The practice of feeding wheat germ oil as a treatment for sterility has been popular for many years. Many vendors of minerals and vitamins find it easy to make sales today on farms where sterility is a problem. The demand for "shots" for sterility has resulted in much indiscriminate use of ascorbic acid and the hormones. Recently, various factors have concurred to popularize the vaginal douche first—before mating. *Brucella abortus* strain No. 19 is blamed repeatedly for causing sterility, and high protein diets are also incriminated. No question is raised as to the propriety of these treatments or theories when adapted to specific cases, but their general use without diagnostic consideration of the problem is not compatible with the practice of medicine.

When veterinary service is requested for a reproductive problem herd, it is usually because of one or more of the following symptoms: Cows are not coming in heat, or they are in more or less continual heat, or they have been mated repeatedly at regular or irregular intervals without conceiving, or, there have been abortions in the herd. Assuming that the quality of bull service is found to be satisfactory, the problem then is to diagnose abnormalities in the females.

Genetic factors as a cause of sterility are usually individual in nature such as free martins or cases of white heifer disease. Occasionally it is believed that an intensely inbred heifer is a sterility problem for that reason.

Nutritional deficiencies as a cause of sterility present a complex problem; in general, we would not expect nutritional lapses to be a cause of sterility in cattle, unless that deficiency also resulted in other and more obvious symptoms. An exception to this general rule may be found in a low vitamin A intake, where lowered resistance of the mucous membranes to infection may result in inflammation and sterility without well-defined, outward symptoms of vitamin deficiency. The ration and the husbandry practices in a problem herd should be considered carefully, along with the general physical condition of the animals. We would not expect optimum physiology for reproduction in an animal showing excess lacrimation, tight skin, dull hair coat, arched back, and enlarged joints or swollen legs, and correcting the nutrition would be an essential part of the treatment.

The other three causes given for sterility are: (1) anatomic malformations, (2) physiological irregularities, and (3) infections.

Inhibition of heat is usually due to the presence of a corpus luteum on an ovary: This may be a corpus luteum of pregnancy and a careful examination for pregnancy should always precede other manipulations of the tract. If a corpus luteum of some duration is present without other symptoms of pregnancy, it is then referred to as a persistent corpus luteum

*From an address at the 65th annual convention of the Indiana Veterinary Medical Association, Indianapolis, Jan. 13, 14, 15, 1949.

†Special Representative, Fort Dodge Laboratories, Inc.

and it effectively inhibits further heat periods. This may be the only finding, or pyometritis, mummified fetus or gross anatomic malformations may be present to complicate the picture. In any case, other than pregnancy or the gross anatomic malformations, the removal of the corpus luteum is the essential part of treatment in order to restore uterine rhythm and the estrus cycle. If possible, it should be enucleated by massage and pressure at the time of the examination. If this fails, reëxamination in two or three weeks usually reveals a partially separated and more prominent corpus luteum, which is then easily removed. Or, from 25 to 40mg of stilbestrol injected in the perineal region is usually effective in one treatment. Stilbestrol is a routine part of the treatment if pyometra or a mummy is present, and the dosage should be relatively high. In pyometra, if the uterus is large, well filled, and devoid of tone, the treatment is irrigation followed by insertion of sulfanilamide in oil. In the case of a mummy, from 50 to 75mg of stilbestrol given subcutaneously in the perineal region is usually successful, and reëxamination should always precede re-treatment. The use of stilbestrol is contraindicated in animals having extensive adhesions or neoplasms.

Occasionally a cow is presented with a history of absence of estrus, and careful examination reveals only a normal tract and some phase of a normal cycle. These silent heat cases may be due to lack of observation by the owner or to hormone imbalance resulting in too little estrin production to cause clinical manifestations of heat. Turning the cow with a bull, usually solves the problem, or the use of a follicle stimulating hormone may result in normal heat in the next cycle.

Luteal cysts, or cysts resulting from degeneration of a corpus luteum, effectively inhibit the estrus cycle. They are small, thick walled, and are the more common form of cystic ovary. Manual removal results in normal estrus in four to seven days, or a large dose of stilbestrol (40 to 50mg) brings on an abnormal heat which usually is followed by normal periods. Service should not be permitted until the first or second normal period.

Small, hard, apparently non-functional ovaries are sometimes found in highly conditioned heifers. These generally respond to massage and the intravenous use of 500-1000 international units of a follicle-stimulating hormone (derived from human pregnancy urine), which may be repeated in 48 hours. Or, a single 10 to 15mg dose of a synthetic estrogen (stilbestrol) given in the perineal region, may invoke an estral phenomena without ovulation, which may then be succeeded by a normal cycle. One should wait three weeks before again treating them. In any such cases, a second treatment with an endocrine product, natural or synthetic, should not be resorted to until the current ovarian phenomena have been evaluated.

Cows that show more or less continual estrus are usually afflicted with follicular cysts, the result of degeneration of an ovarian follicle. These cysts are tense, thin walled, often multiple, and are easily ruptured. The tendency to recur, particularly in cows that have been showing nymphomaniac tendencies for some time, causes a very troublesome problem. Endocrine treatment is effective in many cases. Either 10 to 15cc of anterior pituitary extract, or 2500 to 5000 units of the follicle stimulating chorionic gonadotropin (from human pregnancy urine), given intravenously, is the treatment of choice. It has been recommended that the dosage be divided into two injections and given 48 hours apart. The prognosis is definitely guarded in cases of long standing. The endocrine treatment should not be repeated in less than 3½ weeks.

Other conditions that may cause cows to show symptoms resembling more or less continual heat are acute salpingitis and acute inflammations of the vagina and cervix.

There are several conditions recognized as being a cause of sterility in animals which have been mated repeatedly without success. These include anything preventing the descent of an ovum into the horn of the uterus, and any condition making the uterus uninhabitable for ova or spermatozoa.

Ovarian adhesions and adhesions of the broad ligament, almost always cause sterility if the condition is bilateral. If unilateral, conception may occur. Both ovarian adhesions and salpingitis are ordinarily incurable.

Failure of timely rupture of the ovarian follicle has been a not uncommon observation where extensive inflammatory conditions of the tubular genital organs exist. The follicle is still present, but very easily ruptured two or three days following the cessation of estrus. Cystic degeneration does not usually occur in these cases because heat does recur, although at lengthy, irregular intervals. Alleviation of the inflammation of the tubular organs results in correct timing of follicle rupture as evidenced by the fact that conception then takes place.

Metritis is a very common cause of sterility. Its presence may be grossly evident because of size and lack of tone of the uterus and the nature of the cervical discharge; it may be suspected because of very slight abnormality in size or tone, or it may be diagnosed only on

autopsy or by histological section. Not uncommonly, cervicitis is present at the same time and there is a question as to which occurred first. Again, the cervicitis is sometimes believed to be due to the forward progression of a severe vaginitis. This is not an unreasonable assumption due to the tubular nature and the continuity of the tract. Treatments are designed to expel foreign material from the uterus, eliminate infection and inflammation and to promote a cleansing of the tract.

Vigorous massage of all parts of the uterus along with enucleation of the yellow body will usually result in an emptying of that organ. From 25 to 40mg of stilbestrol is helpful. If the discharge is scanty or absent, irrigation is indicated and it may be possible only during estrus. A 3% or 4% Lugol's solution is commonly used. Iodized oil or sulfanilamide in oil may be injected to promote expulsion of debris and to keep the tract open. Recent reports credit penicillin with being of considerable value in treatment of chronic metritis.

Treatment of cervicitis is successful in a high percentage of cases if extensive fibrous growths have not distorted or distended the passageway. If it is primary in nature, treatment consists of painting the cervical canal and the external cervix with full strength Lugol's solution. Do not repeat in less than 15 to 20 days. If the cervicitis occurs in conjunction with a severe vaginitis, several treatments at weekly intervals with the kaolin quaternary ammonium powder containing stilbestrol is very effective.

Vaginitis is so common that it is difficult to find a herd in some areas where it cannot be demonstrated. In some herds it reaches a degree of severity such that practically no conceptions occur. Hyperemia of the vaginal wall is obvious, with flake-like patches of sloughing epithelium appearing gray or white against the red background. A similar involvement of the cervix is common, and there may be a sympathetic metritis with swelling and congestion. Heat periods are erratic both in duration and interval.

Treatment of vaginitis must be directed at control of the infection with alleviation of the inflammation and subsequent cleansing of the tract of epithelial debris. Several insufflations of the cervix and vagina at five to seven-day intervals with a kaolin quaternary ammonium adsorbate powder containing a small amount of an estrogenic substance is an effective treatment when combined with precautions to prevent reinfection. Many other treatments have been used with varying results. These included caustic iodine, gentian violet, silver picrate, nitric acid, iodized oil, the sulfonamides, healing powders, and irrigation solutions of various germicidal agents. Douching with a solution of sodium bicarbonate or saline about 30 minutes before mating appears to be helpful in those cases that have apparently recovered from the acute inflammation but in which the tract has not yet cleansed itself of the toxic products and cellular debris.

Internal medication with an alternative and

In metritis vigorous massage of the uterus along with enucleation of the yellow body will usually empty the organ

hematinic is a valuable adjunct to local treatment where there is considerable suppuration of the tubular genital tract. Therapeutic levels of the iodides and the arsenicals have been used without undesirable sequels.

If there is a history of abortions in the herd, every attempt should be made to identify the cause. Although the majority of abortions in cattle are caused by *Brucella abortus*, other specific infections resulting in a herd problem are *Trichomonas fetus* and *Vibrio fetus*. Occasionally, non-specific infections such as staphylococci and streptococci cause one to several abortions in a herd. Abortion as a result of trauma may be seen under certain husbandry conditions. Every attempt should be made to ascertain the cause. If there is reason to suspect some infection other than Brucella, then differential laboratory tests are necessary, since clinical differentiation is not possible. Trichomoniasis examination is best done at the barn, using material freshly procured from the cervical canal, uterus, or vaginal floor, and with the low power microscope. Specimens for examination for *Vibrio fetus* or for non-specific infections should be forwarded to a laboratory. The best method of control in the female is sexual rest for three to four months followed by either artificial insemination or by mating to a clean bull.

Mastitis in Dairy Cattle*

By J. W. CUNKELMAN,† D.V.M.
Fort Dodge, Iowa

IT IS difficult to formulate a talk on mastitis in cattle which is not largely a repetition of what has been said or published many times. Despite a large volume of research in the past decade, and hundreds of publications on some phase of the problem, mastitis continues to be the most expensive and the most trying problem confronting the dairyman and the practitioner. A preponderance of the published material in veterinary journals has dealt with the therapy of mastitis. Of 32 separate articles appearing in three monthly veterinary journals and one quarterly in the past 18 months, two had to do primarily with cause and prevention, three had to do with incidence, four had to do with some phase of diagnosis, and 23 had to do with the theurapeutics of mastitis. Practically all advertising and other information going to the laity on the subject of mastitis has to do with treatment.

Despite the fact that the proper use of our newer methods of treatment results in the salvage of many animals that otherwise would have gone out of the herd, the slow decrease of clinical cases in herds depending on chemotherapy alone as the control measure has been very discouraging. This fact added to the way chemotherapy is, all too often, recommended and administered has lead many dairymen to attempt their own therapy with equally or more discouraging results.

Area control of mastitis under organized supervision is being attempted in several places, but the great majority of practitioners are dependent upon their own efforts to combat the disease in the herds of their clients. Because of conditions more or less beyond their control, these efforts are mainly limited to treatment of individual clinical cases. All authorities are agreed that such treatment should be considered only as an adjunct to a prevention program if disease is to be controlled.

That it can be prevented or controlled is indicated by reviewing these general results of research which has demonstrated that—

1. A high percentage of all bovine mastitis is caused by *Streptococcus agalactiae.*
2. Mastitis caused by *Str. agalactiae* is contagious.
3. The source of infection is the bovine udder, with the possibility of human carriers.
4. Invasion occurs by way of the teat canal.
5. Herds can be made free of *Str. agalactiae* infection by certain sanitary practices, segregation of infected cows, chemotherapy, and replacement of incurable cows with clean heifers.
6. Herds freed of *Str. agalactiae* infection remain so, with few unexplained exceptions, unless infected cows are added.
7. Practices designed to prevent *Str. agalactiae* infections greatly reduce the incidence of other forms of mastitis.

The one absolute essential for a successful prevention and control program in a herd is that the person or persons directly concerned with the care of the cows be deadly sincere in their desire for a clean herd. All others will break rules and take shortcuts and throw the program out of gear. It should not be started until the owner or caretaker understands that it must include all bovine females on the farm and that it must be considered a perpetual undertaking. It is essential that the herdsman and the veterinarian have the same meaning in mind for the terms "mastitis," "recovering" and "recovered," and "cured." Any explanation or literature furnished should include the following:

Mastitis is a very general term which refers to any inflammation of the udder irrespective of its cause or severity. The term refers to a diseased condition but not to a specific disease. The change from a state of health may be due to noninfectious or to infectious causes. The damaging effects of noninfectious mastitis may predispose the udder to invasion by an infection. If infection occurs, it may be contagious type and spread to other animals in the herd.

Symptoms of infection may vary from entirely unnoticed to very evident in acute local or acute systemic mastitis. If the infection is allowed to follow a natural course, it will, in the majority of cases, result in either rapid, or a more gradual destruction of the mammary gland; depending on the infectious organism and the severity of the attack. A few animals will die from the toxemia and shock accompanying acute mastitis. An occasional case of infectious mastitis is self-eliminating but, does result in some degree of udder damage.

Treatment may bring about elimination of the infection, or it may result in restraining the infection to such an extent that the body defenses are able to prevent the recurrence of clinical symptoms for a variable time. If the infection is contagious, any animal harboring it is a reservoir of infection and a potential spreader in the herd. If the treatment results in elimination of the infection, the udder is

*Presented at the 65th annual meeting of the Indiana Veterinary Medical Assn, Indianapolis, Jan. 13, 14, 15, 1949.
†Special representative, Fort Dodge Laboratories, Inc.

again susceptible to that or other infection.

The terms "recovering" and "recovered" are used only in referring to the alleviation and cessation of clinical symptoms of mastitis. For example, when the milk again is normal, in appearance, after an attack of mastitis, the cow is commonly said to have recovered.

The term "cured" is used only after adequate negative tests follow treatment of a previously diagnosed infection.

As mentioned before, it is necessary that both parties to the endeavor be of parallel thought regarding the above usage.

It is obvious that any general set of rules, such as have been published many times, must be modified to fit the individual farm, physical plant, and herd problem. To mention a few:

1. *The routine milking procedure.*—This should include the regularity of milking, the preparation of the udder and the machine, the average milking time per cow, the method of stripping, and *the after care of the teats.*

2. *Variations in the milking procedure.*—Many prevention and control programs have been greatly handicapped by shortcuts, labor shortages, inexperienced Sunday help, and similar factors.

3. *The incidence of injured teats and udders and their causes.*—This includes such items as proper adjustment of the milking machine, proper application and removal of the teat cups, the length and width of the stanchion, the stanchion separations, the condition of the lots and pasture, and the problem of cattle with horns.

4. *The management of infected cows.*—They should be isolated, if possible, and always milked last. Floors should be limed daily.

5. *The management of replacements in the milking line.*—Heifer calves should be tied for an hour after being pail-fed to prevent them from sucking one another and udder injury. Supernumerary teats should be removed within the first few weeks of life. The udders should be examined at breeding time. The heifer should be considered a suspect until a negative test is obtained after the milk has become normal following calving. Purchased replacements for the milking line should be bought subject to test on arrival and retested at least once before being admitted to the milking line.

One of the most troublesome problems facing the practitioner has been that of not being able to get good laboratory service for the examination of milk samples. Many herd programs have waned and died because of misinterpretation of findings in samples and incomplete reports received late. To balance this criticism, it must be said that the laboratories receive many samples in such condition that no examination should be attempted.

The best way for the veterinarian to overcome both of these problems is to examine the milk samples himself. By use of the direct microscopic examination, he can diagnose, adequately, all but a very few problem cases and these can then be sent on to a laboratory for special consideration. The quality of service which can be given by a practitioner who does his own laboratory work is outstanding along side of that of one who is dependent on a distant laboratory. The main equipment necessary for this procedure is a 37°C. incubator and a microscope with an oil immersion lens. Surprisingly little time is needed after one has become familiar with the technic.

The best time to draw milk samples is just ahead of the regular milking procedure. This is not only ideal so far as good husbandry is concerned, but it also allows the veterinarian to observe the general management, and milking routine, or, good samples may be obtained anytime after two hours following the regular milking time. The herdsman should be thoroughly familiar with the technic of obtaining uncontaminated samples, so that he can obtain and send one to the veterinarian immediately when it seems indicated. This coöperation both lessens the expense of veterinary service and insures earlier contact with trouble cases. It is well to have a few slides showing normal and variously infected and contaminated milks on hand to show the client and to further demonstrate to him the necessity of professional supervision of his control program.

The infected cows in a herd should be divided into two groups; those which are to be treated, and those considered undesirable for treatment. Both the physical condition of the udder and the value of the animal to the herd should enter into the decision. As a general rule, it is unwise to use chemotherapy in any udder showing well defined pathology. Check samples should not be taken for examination in less than five days following the last treatment, and seven days is a more desirable interval. Negative samples from cows having received sulfonamides *per os* within the last few days are apt to be misleading.

The record of efficiency of the various antibiotic agents available for the treatment of infectious mastitis have been published repeatedly. Unfortunately, few practitioners have obtained as high a percentage of cures as was obtained experimentally. This is primarily due to the lack of early diagnosis and treatment before extensive udder damage has occurred. The layman encounters the same

difficulty in his attempts at treatment, since he has available agents for treating infectious mastitis equivalent in efficiency to those we have, and uses them the same way. If we are to give the dairy industry maximum professional service and at the same time avoid the intrusion of laymen in mastitis therapy, we must be able to plug the loopholes in the preventive program and give a superior diagnostic service.

Official Brucellosis Control in Indiana*

By R. F. SMITH, M.D.C.
Boswell, Indiana

I AM very happy to come before this organization again. In a short while I will have served my term as state veterinarian, probably the shortest term any state veterinarian ever served in this state—14 months. I have enjoyed it, but I don't believe I would care for much more of it.

A serious circumstance has developed in Indiana. I think every state veterinarian in the nation has had some experience with it. A year ago we had 5600 herds operating under the brucellosis control plan. The number on the active list today is 3365. We sent a man out to make a check on the farmers and herd owners to find out what had happened. In many cases we find that the veterinarian who tested the herd failed to mark on the test chart whether it was a quarterly test or whether it was a yearly test. He failed to mark on that sheet whether it was a coöperative or local test. And in a lot of cases he marked it local, when it should have been marked coöperative. Just a little checkmark up in the corner of that chart would have eliminated all of this trouble. It is going to be quite a job to check up and find out just what happened in these more than two thousand herds. How are we going to get these farmers all back in the fold again?

In appraisal work, too, we are having difficulty with the reports. The appraisal paper must be exact. Many times we have had a man's name signed, for example, "John W. Smith" in one place and "J. W. Smith" in another. Such an appraisal paper just can't go through. Certain rules and regulations must be followed. There isn't any question that by doing the appraisal work on cattle, veterinarians are saving the state a lot of money, which it would cost to send a man out from the central office to make these appraisals. There is no reason in the world why veterinarians testing the herd can't appraise the reactors, get them off the farms promptly and stop the spread of infection.

However, that paper work has to be exact. When public funds are disbursed it must be done exactly as provided by law.

We have been working all this year on recodifying the livestock sanitary laws of the state; getting them up in shape so that the veterinarian and the livestock producer can operate under them more feasibly.

It isn't possible now for the Livestock Sanitary Board to establish a laboratory, nor can the university establish a branch laboratory. The only organization that can do this is the Federal Bureau of Animal Industry. If we are going to control brucellosis in this state, it is necessary to control the traffic in cattle through sales barns, and to know that they go through clean. If we can get the law changed to authorize a laboratory at each sales barn with the local veterinarian as the technician, I am sure it will be a great help in preventing the spread of brucellosis through the traffic in cattle.

Another thing I am loath to mention, I received a letter from Doctor Hendershott, Secretary of the U. S. Livestock Sanitary Association, this week about the possibility of the Bureau of Animal Industry employing technicians to do blood testing on cattle, also to put a technician, not a veterinarian, in the laboratory at Purdue University. This has been in the offing for some time. Our information is that under no circumstances will that program be put into effect in a state except the Bureau is asked for it.

There have been a few states trying to promote a brucellosis disease control program that apparently can't get a sufficient number of veterinarians for the purpose. They have asked the USDA to send them trained technicians to bleed cattle and also to conduct the laboratory. I want to tell you now that Indiana will not be included in that list.

President C. C. Dobson: The Board of Directors of the Association in session last night, felt that it was proper that this organization go on record opposing this amendment to B.A.I. regulations. Consequently, there has been a resolution prepared expressing our disapproval. It will be presented to the meeting later for approval or disapproval.

*From an address by the State Veterinarian of Indiana at the 65th annual convention of the Indiana Veterinary Medical Association, Indianapolis, January 13, 14, 15, 1949.

Parasitisms in Sheep

By PETER T. ENGARD, D.V.M.
Marysville, Ohio

IN MAKING a diagnosis before undertaking to treat sick sheep, it is well to keep in mind that sheep play host to more parasites than most animals. It may not be the host to a greater number of species of parasites than other animals, but it is likely to be host to more individuals of a given species, and more sheep than any other of the domesticated animals act the rôle of host.

In general the symptoms of parasitism, regardless of the particular kind, are similar; external parasites cause uneasiness, rubbing, and more or less destruction of wool. Internal parasitism produce an anemic condition evidenced by harshness and dryness of the wool; bleaching of wool, skin and the whites of the eyes; also the mucosa of the mouth; and edematous swelling of the lips, between the rami of the lower jaw, and along the brisket.

To the external parasites belong the sheep scab or mange mite, the head scab and foot scab mite, sheep ticks, sheep louse, sheep foot louse, maggots, blue bottle flies and the grub fly.

To the internal parasites belong the stomach worms, lung worms, tapeworms, liver flukes, coccidia, nodular worms, grub worms, thread worms and hookworms.

External Parasites

Among the external parasites, the mange mite is of most importance to the sheep owner and the veterinarian. Some years ago we had a very serious outbreak of sheep scabies in Ohio which took several years to control and eradicate.

In flocks harboring this parasite, the affected animals rub and lick themselves, especially suckling lambs, producing a peculiarly clean, or white spot on the fleece, where their tongues have removed all dirt and grease. When one of these animals is handled the head goes up and it leans against one. When rubbed, infected lambs make a peculiar smacking noise with their lips as though they enjoyed it. When the wool has become ragged and fallen out, one finds the skin covered with dry scabs, under which there are pustules exuding a sticky serum. These patches become larger and larger until the entire back, one or both sides become bare and coated with hard scabs, under which the mite lives. One sheep after another become affected, until the entire flock is one mass of biting, rubbing, scratching, restless sheep, unable to lie down for more than a minute. In searching for the mite a magnifying glass, a flashlight, a pocket knife and a piece of carbon paper are helpful. When the light is focused on suspected areas, mites begin to move to the heat and light and can then be picked up free, or with scab debris. After finding a parasite; place it on the black background of the carbon paper and it can be seen with the naked eye crawling on the paper. Slight magnification shows its four front legs and two or four antennae, according to its sex.

The treatment most consistently successful is dipping the entire flock in the standard lime and sulphur dip. The treatment must be repeated in 12 days if at all possible, and never later than the 14th day. This treatment is more efficient, less costly, and easier on both men and sheep, than the nicotine sulfate dip. The lime and sulfur dip is used at a temperature of 95° to 103° F. and sheep are held in vat for three minutes and are submerged completely when first put in and just before being taken out. Complete instructions can be secured from the Federal Bureau of Animal Industry for the preparation and use of this dip and the equipment necessary. These instructions must be followed faithfully. After dipping, the sheep should be placed in non-infested quarters, as mites can live in barns and crevices of fences and yards for a year, after all sheep have been removed.

Head scab mites and foot scab mites can be destroyed by hand dressing with lime and sulfur dip every five days for a month to six weeks. These mites are rare in this section of the country.

Lice and ticks can be destroyed by dipping in any of the common coal tar disinfectants. Derris and cube dip, when available, is by far the most effective, as it is fatal to a goodly number of the tick pupae. Shearing and removing the wool from contact with the flock before dipping will automatically eliminate many such parasites.

When a sheep is accidently cut in shearing, or receives some other injury breaking the skin, or lambs are docked and castrated, the various blow flies attack the helpless animal. Sometimes the wool becomes overlaid with fetid discharges, such as urine, feces or pus, in which the fly lays her eggs. Soon a festering mass of maggots is present, and too often not discovered until the animal is nearly dead.

*Presented at the 65th annual meeting of the Indiana Veterinary Medical Assn., Indianapolis, Jan. 13-15, 1949.

Any lagging, listless sheep should be examined thoroughly for maggots, especially if any dampness in the wool is discovered.

A solution of one part diphenyl with seven parts of benzol will quickly bring the parasites out of the abscess. All wool should first be clipped from the surrounding area. This solution should be used several times a day, until all eggs have been hatched and larvae are killed—the period of incubation for the fly eggs is about nine hours. A healing oil should then be applied; scarlet balsam, tincture benzoin, camphorated oil, or pyoctannin. Oil of sassafras and wood alcohol, ether, and sweet oil are also effective agents for removing larvae.

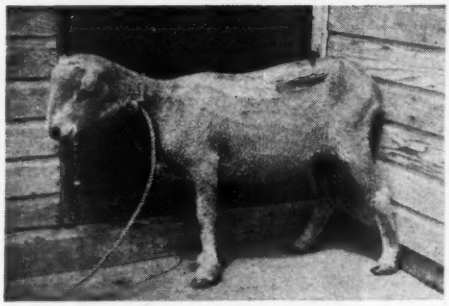
The sheep bot fly or grub fly attacks sheep in pasture, depositing living larvae in the nostrils and on the lips of the sheep. These crawl up into the nasal cavities, causing a violent catarrh, and in severe invasion, death may result. The common mussy nose of the coarse wool sheep should not be confused with this condition. Sheep at pasture will suddenly start running, sniffling as though it had something lodged in its nose. The rest of the flock will keep their noses close to the ground, stamp their feet and show signs of fear, or suddenly run for the barn. Keeping sheep's noses smeared with tar, or feeding salt out of a narrow trough with tarred edges, and providing a very dark shed for shade will help prevent infestation. Gunny sacks saturated with coal tar dip, hung in doorway, low enough to brush animals back will help to keep all flies away.

Internal Parasites

Of the internal parasites probably the most important group are the stomach worms. This group, because of its wide distribution and the vast number of sheep infested, causes more financial loss to sheep raisers through shrink of wool clip, slow gains on feed, and death of infested sheep, than all other parasites combined.

A study of its life cycle and of the lesions it produces, is essential to any intelligent effort to control stomach worm infestation.

The stomach worm made its first appearance in the United States in 1893 and 1894. This parasite is a brownish colored thread worm. The female often appears as two worms wrapped around each other, one being deep red in color, the other of a lighter shade. This appearance is due to the fact that the digestive and reproduction organs are more highly colored than the rest of the body. These parasites mate and live in the abomasum while in the host. Here they lay their eggs which later pass out of the body in the feces. Under proper conditions of heat and moisture, the young larvae emerge from the egg and become active, although at this stage they are not infective. The eggs and newly hatched larvae are killed by freezing and drying; after the larvae reach the infective stage, which



Ewe heavily infested with stomach and intestinal parasites

occurs in warm weather in about a week, or in cool weather in three or four weeks, they begin to crawl up the blades of grass, ready to be taken in by the unsuspecting hosts. The infective larvae move up the blades of grass only during rainy weather, or when dew is on the grass, or when atmospheric conditions are such that the grass blades are covered with a film of moisture. When the young worms become dry, they become inactive, but as soon as moisture is again present, they crawl further up the blades of glass. Whether inactive or crawling, they are ready to continue their development when swallowed by a suitable host. Within two or three weeks after reaching the abomasum, the young worms are sexually mature, mate and begin producing eggs. Thus it is possible to have a new generation of parasites every 30 days.

A post-mortem examination reveals the presence, in the abomasum, of clumps of reddish brown worms, resembling masses of corn silk. Sometimes the entire contents of the abomasum will seem to be a writhing, fermenting mass of ingesta. Again one may have to remove the contents of the stomach to find a few, or hundreds of the parasites fastened to the mucosa. In badly infested cases the carcass is bloodless, the loose connective tissue and omentum saturated with a watery fluid. These parasites, being blood suckers, rob the host of blood and their secretion destroys the red blood cells and hemoglobin content.

Treatment of stomach worm infestation consists of periodic administration of anthelmintics, and change of pasture to prevent reinfestation. There is an old saying among

sheep men that sheep should be kept on the same pasture no longer than two weeks at a time. This is good practice even though they may not know why. To me the explanation for this practice is quite plain. The longer sheep are kept in the same pasture, the closer to the ground the grass is grazed, thus making the length of the parasite's journey from

Getting a grip on the sheep, the author can administer an anthelmintic with ease

ground to sheep's stomach much shorter. Since sheep eat the more tender leaves and shoots of the grass first, the higher the grass grows the longer it will take the parasites to reach those tender shoots. The matter of dilution is also involved. If one million infective larvae are distributed over 1000 pounds of grass on an acre and a sheep eats 20 pounds of the grass it would ingest 20,000 larvae. If there are 5,000 pounds of grass on the plot, the sheep would ingest only 4,000 larvae with 20 pounds of the grass.

Anthelmintics used over the years have been varied and many. When I first began to pay attention to sheep, my clients were drenching with gasoline and milk, which was dangerous to say the least. Then came copper sulfate, quickly followed by Lugol's solution, black leaf forty, tetrachlorethylene capsules and compressed tablets of copper sulfate and nicotine sulfate combined. In the last few years kamala extract has been added to these tablets, and recently a new drug, phenothiazine, has become popular with sheep raisers, I have used all these agents, except gasoline. Under certain conditions I still use some of them, but my stand-by is copper sulfate, in a 2% solution, given in varying amounts; one ounce for baby lambs, two ounces for 40-pound lambs, three ounces for 60-pound and four ounces for sheep weighing 80 pounds or more. This treatment can be repeated in 10 days in badly infested flocks, and every three to four weeks thereafter. This solution not only acts as an anthelmintic but also as a tonic.

One pound of C. P. copper sulfate crystals is dissolved in two quarts of boiling rain water or distilled water. After cooling, add enough water to bring the solution up to two full quarts. This is the stock solution. Taking 5.5 ounces of this stock solution and adding enough rain water to make one gallon, gives a solution of 2% strength for use. Use only C. P. crystals and rain water or distilled water.

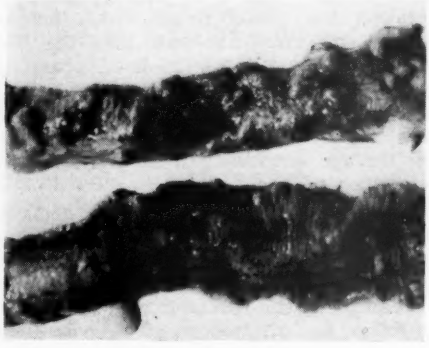
I am of the opinion that the write-up in lay papers, farm and stock publications and even some government bulletins has given the public a misplaced confidence in the efficiency of phenothiazine. Every patent medicine house, every mail order house, farm bureau and drug store has stocked phenothiazine tablets or boluses and powder. As a result there are all kinds of prices and I suspect plenty of adulteration or stinting of dosage. There are several disadvantages in giving compressed tablets or boluses. As a rule they are not readily soluble, if large they may be regurgitated and spit out by sheep, after being turned loose. If small, tablets may lodge in pharynx and cause necrosis. Some sheep men are depending on adding anthelmintics to the salt for their flocks. I do not know exactly how much salt a sheep will consume in a week or a month but the more it is medicated the less they will consume. One flock owner was using $20.00 worth of phenothiazine in salt per month for 1000 head of sheep. Mathematically each sheep was consuming one-fifth of a pound of salt per month. Since he was mixing salt and phenothiazine in a ratio of 10:1 there would be 1.5 ounces of phenothiazine per pound of mixture—approximately two full doses of the anthelmintic to one pound of mixture. Each sheep was therefore consuming two-fifths of a dose every 30 days.

Needless to say when his lambs and ewes began to go to pieces and finally began to die, he was at a loss to understand what was wrong. There is no need to describe the condition of those sheep. Stomach worm infestation was demonstrated and individual treatment was given with satisfactory results. All he lost was a few lambs and a season's growth on the remainder of the flock + $20 a month.

In using phenothiazine I buy a suspension carrying 3.5 drams per ounce which I further dilute by adding an equal volume of rain

water, or better yet, skimmed milk—giving the same size doses as of copper sulfate. Since I administer all medication via a stomach tube, the diluted preparation handles easier in both syringe and tube.

Sheep are the hosts for several different species of tapeworms, varying in length from three to five inches to as many feet or longer. The symptoms are those of general unthriftiness. Diagnosis is made upon post-mortem findings or passage of segments in the feces. Some varieties are found in duodenum and bile ducts, producing an icterus. Others occur throughout the small intestines. Treatment consists of a drench of 1% copper sulfate, followed in a week or 10 days with a dose of kamala, copper sulfate and nicotine sulfate



Sheep will live for years with nodular worm infestation but the intestines are ruined for casings

in compressed boluses in capsules, or kamala alone given in capsules—one dram to lambs, two drams to adults.

In performing autopsies to determine parasite infestation one frequently finds the walls of the intestines studded with small circumscribed nodules easily seen, and felt as hard rough areas. Section of such a nodule reveals a green, cheesy, gritty center. The nodules may be confined to one small section of the intestine or may involve the entire tract and the omentum. Those nodules represent the damaged tissue, and debris left by the larvae of the nodular worm. These parasites lay eggs which pass with the feces to the ground to hatch and after certain development reach a state where they are picked up with water and grass. When the larvae reach the intestines they burrow into the intestinal wall. After leaving the nodules they develop rapidly.

Treatment is in general the same as for stomach worms, with particular attention being paid to frequent changes of pasture and clean drinking water. Sheep will live for years with an infestation of these parasites but since the nodules ruin the intestine for use as casings for weiners, frankfurters, hot-dogs, sausage, etc., there has been quite a lot of publicity given to this disease; more than to the stomach worm because the stomach worm kills his victim and no one except the farmer is any the wiser.

A year ago we were called by a feeder to determine the cause of a high mortality in a large bunch of lambs he had purchased some weeks previously. These lambs were exhibiting evidence of great depression, haggard look about eyes, refusing to eat, staggering when walking, becoming so weak they could not rise; death being hastened by other lambs trampling them. A foul-smelling diarrhea, usually blood being mixed with the feces, developed after the first 24 hours. The lambs died rapidly for the first 24 hours. Post-mortem examination revealed, in addition to the enteritis, a thickening of the walls of the small intestines, also small, whitish areas varying in size from that of a pin point to a pea. These were very numerous, and could be seen before the intestines were opened, although to the sense of touch, the serous cover was perfectly smooth. Microscopical examination of scrapings of mucosa, and of feces from live and killed lambs, revealed coccidia swarming in hundreds over the field.

Treatment consisted in placing lambs on dry feed, in dry lots, which were raked, and fresh straw placed for bedding daily. Two ounces of mineral oil carrying subnitrate of bismuth three grains and tannic acid, two grains per ounce was given the first day, and one ounce per day thereafter until scouring ceased. Sulfaguanidine in tablets or mixed with grain or bran is worth trying.

Two species of lungworm commonly infest sheep. One of these is known as the thread lungworm, the male being one to three inches in length and the female two to four inches. They inhabit the bronchi and bronchioles, and produce a condition known as verminous bronchitis. The eggs, which contain the embryo when deposited, hatch in the lung, and the larvae are coughed out, or are swallowed and pass out with the feces, after which they undergo two molts, and become infective in about 10 days. These infestive larvae are taken into the body with grass, and make their way to the lungs, where they become sexually mature in about five weeks. The presence of the worms, eggs, and larvae in the bronchioles cause an inflammation of the mucous membranes and adjacent lung tissue. Pneumonic areas are formed, usually along the lower edges of the lung. These areas are red in color, and triangular in shape, being separated from

each other by puffy, emphysematous areas.

The other species is commonly called the hair lungworm, the male being one inch long,

Bronchi open to show the lung worms and excess mucus

and the female but slightly longer. These parasites are found in the finer bronchioles, where they cause inflammation of the surrounding tissue in the form of lobular, pneumonia. The life history of this species is unknown beyond the fact that the larvae are liberated in the lungs. The only symptom particularly different from any other case of parasitism is a peculiar husky cough. The treatment consists of administering chloroform through inhalation until patient or victim falls off its feet. Then allow to recover. Intratracheal injection of pyrethrol five and deobase, equal parts in 5cc doses has been used with good results. Care must be used in making the injection as the combination is very irritating, causing abscess formation if deposited in tissues outside of trachea or into the mucosa lining trachea. Intravenous injection of a solution of iodine crystals one gram, potassium iodide two grams, in 1500cc of distilled water. The dose is, lambs 5cc; yearlings 10cc and ewes 12 to 15cc. This preparation has been used successfully.

The liver fluke is a parasite not often encountered in this section of the country; if we can judge from the history of other parasitic infestation it will no doubt become common. The mature fluke, *Fasciola hepatica*, is a pale brown, flat, leaf-shaped worm, about 1.25 inches long and one-third to one-half inch wide. It develops in the bile ducts, where it remains from nine to 10 months. It is estimated that each fluke will lay 100,000 eggs. These are passed with the feces, and upon reaching water incubate in warm weather in from three to six weeks, each egg ultimately liberating a ciliated larva, which attacks certain small, amphibious, fresh-water snails.

Failing to find a suitable host within three hours, the ciliated larvae perish. The snail hosts are small, right-handed snails, the shell opening on the observer's right when the peak of the shell is uppermost and the opening faces the observer. They are found in ditches, lakes and sloughs, showing a marked preference for mud. In 49 to 80 days after becoming infested, the snail host will liberate into the water numerous free-swimming, minute tad-pole-like young flukes. As these swim about they form figure eights, and upon striking any of various objects such as grass and leaves, encyst on them, or they may encyst in the water and float free on the surface. These cysts, which resemble tiny pearls, are the infective state, ready to be taken up by sheep that may drink the water or eat the grass. Upon reaching the digestive tract the cyst wall is dissolved, liberating the young fluke, which burrows through the intestinal wall into the body cavity, finds its way to the liver, penetrates the capsule into the liver tissue, and finally comes to rest in the bile duct, where it reaches sexual maturity. It takes six months from the time the egg hatches until the mature flukes are producing eggs.

The clinical symptoms of fluke infestation are similar to all the other internal parasitisms. The history of this trouble is a little different, in that due to increased secretion of bile, caused by the stimulation of the liver by the flukes, the infested sheep seem to fatten readily. This fattening is only temporary, as later the sheep lose flesh rapidly, lag behind the flock, and graze very little.

The treatment is safe, reliable and inexpensive. Carbon tetrachloride is used in 1cc doses repeated in three to four weeks.

As snails are essential in the life cycle of the fluke, their destruction means the destruction of the fluke. Copper sulfate in dilution of 1:1,500,000 is lethal to the snails. Dry copper sulfate mixed with six to eight parts of lime, land-plaster or sand may be broadcast over sloughs or ponds or may be placed in sacks in running water.

The fight against parasitism requires patience, eternal vigilance, and the methodical planning and prosecuting the attack. Often the difference between success and failure depends, not upon the medical agent used, but upon the care and feeding of the patient. Sheep must be put on clean pasture, or if none is available, placed on dry feed, roughage and grain. Feed a grain ration of three parts wheat bran, three parts ground oats, and one part of tankage, oil meal or cotton seed meal. Feed this for three weeks, then gradually replace bran in the feed with cracked corn.

Recent Development in Swine Nutrition*

By DAMON CATRON, Ph.D.
Ames, Iowa

FIVE major developments have occurred in the field of swine nutrition since the turn of the last decade, namely:

1. Recognition of "nutritionally critical" and "nutritionally noncritical" periods.
2. Evidence of the "residual" or "carry-over" effects of feeding.
3. Development of efficient drylot rations.
4. Apparent effect of "disease level" on ration formulation.
5. Discovery of the "animal protein factor" —its rôle in swine nutrition.

These five very important developments promise to have a profound effect upon swine feeding in the future.

Nutritionally "critical" and "non-critical" periods.

Based on recent swine feeding research at several agricultural experiment stations, the different stages of swine feeding can now be fractionated into "nutritionally critical" and "nutritionally non-critical" periods. Research indicates the critical feeding periods to be as follows:

1. Gestation, especially in winter drylot.
2. Lactation, especially in early spring drylot.
3. Young pigs (post-weaning), especially in early spring drylot.

The non-critical periods are:

1. Growing-fattening pigs from 75 pounds to market in drylot (providing that they have been fed properly fortified rations up to 75 pounds).
2. Swine of all ages on *good* pasture.

The critical periods require more highly fortified rations than do the non-critical periods. It is necessary to include additional B-complex vitamins, the "animal protein factor" and trace mineral fortifications in the critical period rations (figure 1).

The growing-fattening period from 75 pounds to market, even under drylot conditions, is not considered a critical period from the nutritional standpoint. Support for this statement is found in the fact that rations which did poorly in drylot when fed to pigs below a weight of 75 pounds, were quite satisfactory for pigs weighing more than 75 pounds. This indicates that rations for older pigs do not have to be as carefully formulated as appears necessary for the younger group.

As farm grains are deficient in certain vitamins and minerals as well as protein, the protein content alone should never be the sole criteria in the evaluation of a supplement.

In interpreting the experimental results of feeding supplements in the past, the results, whether attributable to proteins or vitamins, have sometimes been confused. Much work may have to be repeated in order to differentiate feedlot responses from proteins, vitamins or minerals.

"Residual" or "carry-over" effects of feeding

Pigs have the ability to store water-soluble as well as fat-soluble vitamins in certain body tissues when liberal amounts are fed. These "storehouses" may be used to "tide them over" later when rations are fed which are inadequate in these stored factors. Swine nutritionists call this a "carry-over" or "residual" effect of feeding. For example, gestation feeding is reflected in lactation results.

Figure 2 shows the influence of the ration fed to sows during gestation on the vitamin content of their milk during the subsequent lactation period.

Another illustration as to how pre-gestation and gestation rations can affect the viability and growth of pigs is shown in figure 3.

Pigs fed well during the nursing period will reflect this higher plain of nutrition when fed on nutritionally marginal rations or less highly fortified rations (and less expensive) after weaning.

There are two kinds of "storage" or "carry-over." (1) The kind that is shown in drylot feeding by pigs formerly fed on pasture. In this case, the pigs previously fed on pasture will respond more favorably than pigs which have been fed continuously in drylot. (2) The kind of "carry-over" shown by pigs formerly fed highly fortified rations.

The practical application of this "carry-over" effect in growing-fattening pigs is shown in figure 4. It will be noted that the pigs in lot II, which received the more highly fortified supplement up to 75 pounds, made faster daily gains on less feed per 100 pounds of gain than did the pigs in either lots I or III which were fed in the usual manner. This demonstrates the greater efficiency and practical economy of feeding a more highly fortified supplement up to 75 pounds, then changing to a more economical supplement from 75 pounds to market weight.

We have limited experimental evidence, at the Iowa station, indicating that the feeding

*Presented by Dr. Damon Catron, Animal Husbandry Department, Iowa State College, at the 65th Annual meeting of the Indiana Veterinary Medical Association, Indianapolis, January 14, 1949.

of a well-fortified ration during the nutritionally critical periods of gestation and lactation may manifest itself all the way from weaning through to market. Rations highly fortified with water-soluble vitamins were fed to sows during gestation and lactation. After weaning, one lot of these pigs which received a supplement of soybean oil meal, meat scraps, complete mineral mix and vitamin D_3 made as good daily gains (1.77 pounds on 343 pounds feed per cwt. gain) as did other lots receiving the same supplement including high quality dehydrated alfalfa meal as a source of B-vitamins. The latter lots made daily gains of 1.60 to 1.74 (av. 1.70) requiring from 349 to 378 (av. 359) pounds feed per cwt. gain. If future feeding trials confirm this work, we may no longer consider the period from weaning to 75 pounds to be nutritionally critical if properly fed during gestation and lactation.

Development of efficient dry-lot rations

Experimental evidence shows that it takes a better ration to do the job in drylot than on pasture. Pasture feeding can cover up a lot of drylot "feeding sins." Many farmers have been turning to the use of concrete lots to overcome swine diseases, parasites, water hauling and fencing problems. This definitely creates nutritional deficiencies—new experiences for many. Most of these deficiencies show up in drylot during the critical periods below 75 pounds.

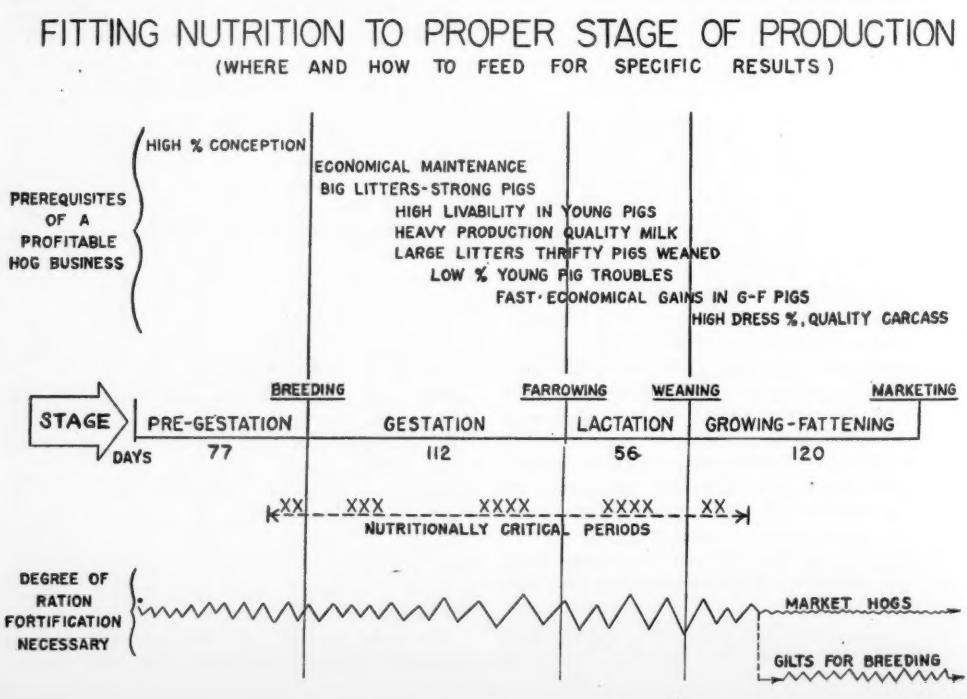
Many rations which once gave excellent results in pasture feeding, result in slow growth rate, scouring and high death losses under drylot conditions.

A well-planned, swine pasture program can stretch feed supplies, save labor and make more thrifty pigs. The Iowa station has been comparing swine production on concrete and pasture. Good alfalfa pasture has saved from 25 to 371 pounds of feed, from the best to poorest conditions, in producing 100 pounds of pork.

During the past three years, we have been trying to develop more efficient drylot rations at the Iowa station. Alfalfa meal, distillers solubles, fish products, milk by-products, thyroprotein and synthetic nutrients have all been included in basal rations of yellow corn, soybean oil meal, complete mineral mix and vitamins A and D_2 (with and without meat scraps) in attempting to improve reproduction, lactation, daily gains and feed efficiency.

Inasmuch as it would be too voluminous to present the results of many drylot feeding experiments in detail, the over-all summary for the successful supplementation of common

FIGURE 1



rations for gestation-lactation is shown in figure 5.

The summary of recommendations for supplementation of all-plant rations for growing-fattening pigs fed in drylot are as follows in figure 6:

There is every reason to believe that we can formulate practical drylot rations for growing-fattening pigs that will equal, or even surpass, our present good pasture rations in both performance and feed efficiency.

"Disease Level" affects rations needed

We are proposing a new factor which affects the degree of fortification necessary in swine rations. We are calling this factor the "disease level" factor. In other words, to what degree are the fields, lots and buildings on any given farm contaminated with disease? As yet, we can only offer indirect evidence substantiating this theory which is based on comparative experiments and careful observations at different places.

Differences in the "disease level" on different swine farms is the *only* satisfactory way of explaining the great variability in response to identical rations fed to well-bred pigs under approved management conditions. One man fails while the other succeeds on the *same* organisms and ultra-microscopic viruses which may latently await specific, optimum conditions before striking. We contend that pigs fed in an environment with a high "disease level" require more highly fortified rations than pigs fed in low "disease level" surroundings.

We are making electrophoretic blood studies on all ages of swine fed different rations in an attempt to link the plane of nutrition to the gamma globulin fraction of blood serum wherein resides the antibodies and resistance to disease. A report on this work will be published upon completion of these studies.

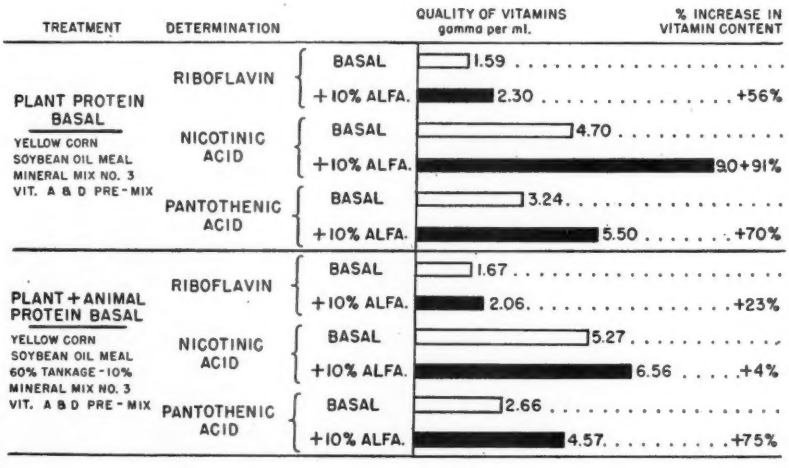
Medical research shows that antibodies, which combat disease, are protein in nature. If blood protein is too low, production of antibodies is impaired and, consequently, resistance to disease is lowered. Protein feeds are protective feeds—protective against malnutrition and subsequent infections. Many examples of the ill effects of low protein diets were obvious in starvation countries following the last war.

"Animal Protein Factor" (APF)—Its Rôle in Swine Nutrition

During the past decade, nutritionists have observed the presence of nutritional factors

FIGURE 2

INFUENCE OF RATION FED DURING GESTATION ON VITAMIN CONTENT OF MILK



ration. The swine expert can go out and check each swine producer's situation objectively. Both breeding and management may check as satisfactory. Only veterinarians can appreciate the devastating potentialities of microscopic essential for reproduction and growth in animal proteins but lacking in plant proteins.

Poultry nutritionists, leading the research, found that all-plant rations fortified with all known vitamins failed to give optimum hatch-

ability and chick growth. Swine nutritionists experienced similar failure in reproductive performance and pig growth when all-plant rations were fed.

The deficiency of the corn-soybean oil meal basal ration was corrected by the addition of liver meal, fish meal, condensed fish solubles, dried milk by-products, or, to a lesser extent, by meat and bone scraps or tankage—all sources of the "animal protein factor."

Because of this factor's intimate association with proteins of animal origin, it was unfortunately misnamed the "animal protein factor." APF, as it is now commonly called, *is not a protein* but a water-soluble vitamin, or a combination of vitamins or "vitamin-like" factors.

The Wisconsin station working with swine and the Beltsville Research Center in experimenting with poultry have demonstrated that

FIGURE 3

EFFECT OF PRE-GESTATION & GESTATION RATIONS
LIVABILITY AND GROWTH OF PIGS

PRE-GESTATION AND GESTION RATIONS [1]	FARROWING RECORD			WEANING RECORD			
	AV. NO. PIGS PER LITTER	AV. BIRTH WT. (LBS.)	% STRONG PIGS	NO. LITTERS WEANED	PIGS WEANED PER GILT FARROWED	AV. PIGS WT. (LBS.)	% PIGS WEANED
I. BASAL YELLOW CORN S.B.O.M. ST. BONE MEAL PULV. LIMESTONE SALT, IODIZED C.L.O.	7.5	2.24	59	8	3.0	21	40
II. BASAL & 5% DEHY. ALFA. MEAL	8.9	2.48	80	14	7.5	23	84
III. BASAL & 5% DRIED WHEY	8.5	2.33	65	10	4.4	24	51
IV. BASAL & ALFALFA PASTURE	8.8	2.47	77	12	7.0	24	80

[1] FED UNTIL 2 WEEKS AFTER FARROWING; THEN FED CORN, WHEAT MIDDS, PROTEIN AND MINERALS ON RYE PASTURE REMAINDER OF LACTATION.

14 GILTS BRED PER LOT; 13, 14, 13, AND 12 GILTS FARROWED IN LOTS 1 TO 4 RESPECTIVELY.

FIGURE 4.—"CARRY-OVER" EFFECT OF FEEDING YOUNG PIGS (FALL PIGS IN WINTER DRYLOT AFTER WEANING)

Treatment	Lot I Modified "trinity" mixture (incl. minerals & vit. D) (44.8 lb. to mkt.)	Lot II To 75 lbs. highly fortified mfg. supplement (36.5%) 75 lb. to mkt. A good av. mfg. suppl. (36.5%)	Lot III Good av. mfg. suppl. (44.8 lb. to mkt.)
No. pigs per lot	15	15	15
Av. starting wt. (lb.)	44.8	44.8	44.8
Av. final wt. (lb.)	219	220	221
No. days to reach mkt. wt.	140	120	134
Av. daily gain (lb.)	1.25	1.46	1.31
Total feed per 100 lb. gain (lb.)	402	389	399
% Protein in suppl.	43.5%	36.5%	36.5%

1. Each lot received supplement (minerals included) fed free-choice with shelled corn.
2. Modified "trinity" supplement equals SBOM 500, 60% tankage 1000, dehy. alfalfa meal 500, minerals 80, vit. D_2 pre-mix 5 lb.
3. From the time the sows were bred until the pigs were weaned and on trial, they all received the same highly fortified supplement with grain on fair alfalfa pasture. Therefore, some "residual effect" influenced all lots, especially lots I and III. to do better. Reference—personal data.

cow manure contains APF activity. The Ohio station, followed by work at the Washington station, observed APF activity in hen feces.

FIGURE 5.—FORTIFYING RATIONS FOR BROOD SOWS FED CONTINUOUSLY IN DRYLOT.[1] PRACTICAL SOURCES OF SUPPLEMENTARY FACTORS ESSENTIAL FOR OPTIMUM PERFORMANCE

I. As supplements to "corn-soybean meal" rations—
5-15% alfalfa meal (high quality)
5% alfalfa meal + 10% dried corn distillers solubles
5 to 10% alfalfa meal + 10% meatscraps or tankage
5% alfalfa meal + 2 to 6% condensed fish solubles

II. As supplements to rations containing animal proteins—
10-12% alfalfa meal (high quality)
4% alfalfa meal + 6% dried corn distillers solubles
5% alfalfa meal + 1 to 2% condensed fish solubles
5% alfalfa meal + 1 to 2% condensed fish solubles plus 1% dried fermentation solubles

or

1. Fed well-fortified rations during pregestation
2. Fed good rations on good pasture during pregestation

1. Ref.: Iowa, Illinois and Purdue agricultural experiment stations.

In 1947, the Iowa station initiated a series of experiments on APF with growing-fattening pigs. An all-plant protein ration composed of yellow corn, soybean oil meal, 5% dehydrated alfalfa meal, mineral mixture (including trace minerals) and vitamins A and D_2 served as the negative control ration. The addition of 2% condensed fish solubles was the positive control ration. Six per cent distillers dried solubles (from Hiram Walker & Sons, Inc.) and two levels, namely 2.0% and 0.2% of a fermented product (from Vi-D-Co), thought to have animal protein factor activity, were added to the basal for different lots of weaned pigs. Although no significant differences in daily gains were noted, significant reductions in feed requirements were obtained when sources of the APF were added to the all-plant protein basal ration.

FIGURE 6.—FORTIFYING RATIONS FOR G-F PIGS IN DRYLOT. PRACTICAL SOURCES OF FACTORS ESSENTIAL FOR OPTIMUM GROWTH AND WELL-BEING.

To supplement "corn-soybean meal-alfalfa meal" rations[1]
2% Condensed fish solubles (red, menhaden or sardine)
4% Fish meal (preferably from *whole* fish)
6% (or more) Meat and bone scraps
6% Dried corn distillers solubles
4 to 8% Dried milk or whey by-product
0.2 to 0.5% "Animal Protein Factor" supplement[2]

or

Fed well-fortified rations before weaning

Ref.: 1. Iowa Agr. Exp. Station. 2. Two experiments.

A quick review of the previous nutritional treatment of the dams of these pigs revealed

that their dams had received 10% of each meat and bone scraps and dehydrated alfalfa meal during both gestation and lactation. Based on poultry nutritional studies on APF and previous swine studies with known water-soluble vitamins it appeared that nutritional "carry-over" of APF in the weaned pigs had masked any real differences in their response to the possible differences in APF content of their experimental rations. The next experiment proved this to be true.

Above is pictured half-monitor farrowing house at the U. S. Department of Agriculture regional research farm, Ames., Ia. Rations highly fortified with water-soluble vitamins were fed to sows during gestation and lactation

In repeating this work, the alfalfa meal and animal protein was omitted from the lactation rations of the sows which produced the assay pigs. The addition of 2% condensed fish solubles, 0.2% Vi-D-Co APF concentrates, 0.5% Merck's vitamin B_{12} concentrate or 6% distillers dried solubles (Hiram Walker & Sons, Inc. each improved significantly the daily gains and feed efficiency over the all-plant ration for the pigs fed from weaning to market weight. The synthesized APF concentrates equalled the performance of the 2% condensed fish solubles, which had proved sufficient in previous tests at the Iowa station, to correct the deficiency of all-plant rations for swine fed in drylot.

During 1948, Merck and Company purified and crystallized vitamin B_{12}, which the Beltsville Research Center found to be the same as the "cow manure" factor. Research indicates vitamin B_{12} to be at least a very important component of APF. It has been proved to be the long sought antipernicious anemia factor. Three commercial concerns are now in pilot plant production of APF concentrates by fermentation, one process employs a mold (*streptomyces griseus*) and the other two a bacterium or group of bacteria.

Research now under way at many research laboratories indicate that APF may have the following great practical possibilities:

1. The new concentrates of APF will extend existing supplies of animal protein and should cut the cost. Livestock feeders never have fed enough animal protein as there never has been enough to go around.

2. Addition of concentrated APF to plant proteins and animal proteins, will make possible more uniform rations with less variation in results.

3. It may be possible to replace all animal proteins with the APF concentrates, although from a practical standpoint this probably will not happen, because animal proteins from the packing house is more valuable as a feed ingredient than as fertilizer.

4. APF may prove of great value in human nutrition both here and abroad. Researchers have found that vitamin B_{12} (an important component of APF) now being produced in eastern pharmaceutical laboratories is effective in treatment of pernicious anemia in humans.

Cooperation solves complex problems

I have attempted to cover, in general, the latest concepts and more important findings in swine nutriton. Many involved and difficult swine problems still remained unsolved. We are finding that nutritionists, veterinarians and geneticists have a deeper appreciation of the need for closer future cooperation in seeking solutions to common overlapping problems. Animal breeders are finding that their inbred lines are more susceptible to disease, regardless of the ration fed. Swine nutritionists are seeing similar rations vary considerably in their performance under seemingly like conditions. And present day veterinarians have a deeper appreciation of the need for adequate nutrition in the prevention and treatment of disease. At least it looks as if "professional isolationism" has no place in the hog lot.

Report of Large Animal Committee*

During the past year there have been some diseases of large animals which have been positively diagnosed in Indiana, perhaps for the first time.

Hyperkeratosis

Hyperkeratosis or *x*-disease has been recognized in Indiana. This disease was first described in New York State in 1941. The cause is not known. Efforts to transmit the disease experimentally have failed. On the other hand, the disease behaves in the individual herd in a fashion which suggests that it may be transmissible from one animal to another.

A national meeting of research wrokers and other veterinarians was held in Washington, D. C. in July 1948 to pool existing knowledge of the disease. Subsequently the Bureau of Animal Industry conducted a survey of this disease in the southern states. To date, it has been reported from 32 states.

To the best of our knowledge, hyperkeratosis has appeared in seven herds in Indiana, involving about 300 cattle. Thus apparently it is not widespread at present in this state, but results have been disastrous in some herds. One herd owner lost, during the past 10 months, 135 head of cattle by death. Other losses from decreased production in animals that survived brought the total loss from this disease to $25,000 in his estimation. So far the disease has been far more prevalent in beef cattle than in dairy cattle, but it has been observed to bring disaster to some dairy herds.

Anaplasmosis

A diagnosis of anaplasmosis has been made in one herd of beef cattle in central Indiana. The financial losses in this herd were severe. Nineteen of 40 animals sent to market were condemned at the time of slaughter.

Anaplasmosis is one of the serious disease handicaps of the cattle industry in the Deep South. So far as can be determined the disease has not previously been found in Indiana.

Deficiency Disease

There is strong evidence to suggest that some herds of cattle located in northwestern Indiana suffered severely from "trace mineral deficiency." At least these cattle showed symptoms commonly attributed to such cause and the herds responded favorably and promptly following trace mineral therapy.

Transmissible Gastroenteritis

Transmissible gastroenteritis in pigs as first described by Doyle and Hutchings in 1946, continues to be a problem of the swine industry. It is not considered, at this time, to be the only nor the most important cause of mortality in baby pigs. It is being diagnosed accurately on the basis of pathological lesions and can be transmitted experimentally at will. It has, therefore, been established as a distinct disease entity and one with which the veterinary practitioner should thoroughly familiarize himself.

Foot-and-Mouth Disease

During the past year the foot-and-mouth disease threat from Mexico has attracted the interest and attention of veterinarians and livestock breeders in Indiana. Certain definite official plans have been prepared to be put into operation immediately if the disease should make its appearance in this state. To date there is no evidence that it has spread from Mexico to any part of the United States.

Queensland Fever

During the past year a relatively new disease, Q fever affecting sheep and cattle and transmissible to humans, has attracted much interest and attention from veterinarians, physicians, and others particularly in the western part of our nation. So far as is known, the disease has not been observed in Indiana.

Brucellosis Control

In accordance with the amendment to the Indiana brucellosis control law, enacted in 1947, which provides for the area plan of control, the cattle in one county (Monroe) have been tested. Several other counties have or are planning to make application to the State Live Stock Sanitary Board for the area plan of control.

Brucellosis in swine continues to be of much interest both from the standpoint of economics and public health. Research with this disease has been fruitful and is continuing. Dr. L. M. Hutchings' work at Purdue University has evolved two practical plans of control which have proved successful in field experiments.

Equine Infectious Anemia

During the past year an outbreak of equine infectious anemia among race horses along the Atlantic Seaboard was quite destructive and alarming. So far as is known, no cases of this disease have occurred in Indiana recently.

*By C. R. Donham, D.V.M., chairman; 65th annual convention, Indiana Veterinary Medical Association, Indianapolis, Jan. 13, 14, 15, 1949.

Practical Therapeutics in Small Animal Practice

By C. D. BARRETT, D.V.M.
Akron, Ohio

THIS paper is intended, mainly, to give assistance to the veterinarian whose practice is mostly among large animals, but who also cares for the small animal ailments in his district. We are agreed that this group comprises the majority of our profession. There will be nothing new or revolutionary discussed, but merely a few simple useful procedures that have been successfully employed in our practice. Technical details with which all are familiar will be omitted.

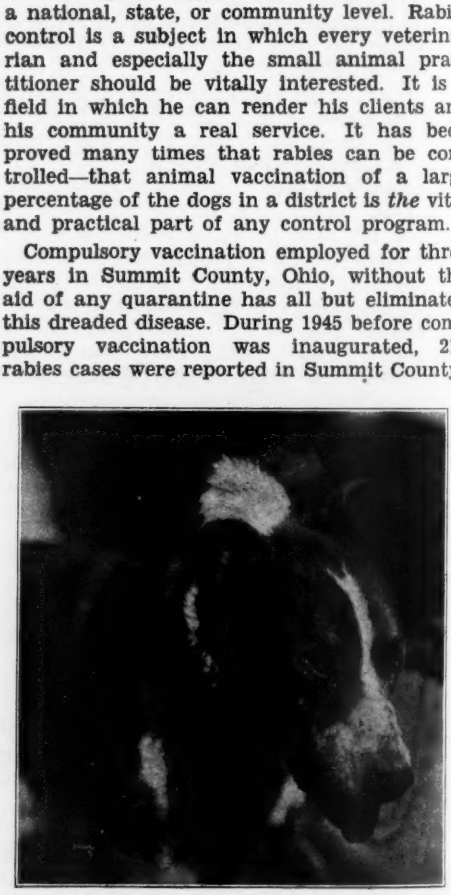
I believe that it is not only economically sound but gratifying to be able to render reasonably satisfactory service to any animal we may be called upon to treat. I believe that when state legislators appropriate funds for veterinary education they have principally in mind safeguarding the health and welfare of the livestock industry, together with the effects it may have on public health. Those who have specialized in fields tangent to this must realize their obligations to the profession as a whole. One should hesitate to give any established practitioner advice on how to run his business. In my opinion he knows more about it than anyone else. I will say that I believe that most large animal practitioners will find it not only profitable to themselves but pleasing to their regular clients to be able to take care of their pets.

With the hope that some part of the contents of this paper may prove helpful we will proceed with the subject matter.

Prophylaxis.—To me this is the most important part of this sort of practice. The prevention of only two of the diseases of pets, namely distemper and rabies, will be discussed. Many years ago the practitioner convinced the livestock owner of the value of preventive treatment for his animals. Advice and help in preventing diseases to dogs will be gratefully received in most cases by the dog owner. Distemper vaccinations are now efficient and can be given with the assurance of a major amount of protection. As to the types of permanent vaccination, we have used most of them. We prefer the three-dose method given at the prescribed intervals—no live virus.

Rabies control programs have been discussed at most gatherings of veterinarians during the past 20 years. All too often our profession has been satisfied to let other control agencies start and foster the programs and has been content, merely to assist when asked. It would seem only natural for the public rightly to expect the veterinarian to be the instigator in working out control measures whether on a national, state, or community level. Rabies control is a subject in which every veterinarian and especially the small animal practitioner should be vitally interested. It is a field in which he can render his clients and his community a real service. It has been proved many times that rabies can be controlled—that animal vaccination of a large percentage of the dogs in a district is *the* vital and practical part of any control program.

Compulsory vaccination employed for three years in Summit County, Ohio, without the aid of any quarantine has all but eliminated this dreaded disease. During 1945 before compulsory vaccination was inaugurated, 218 rabies cases were reported in Summit County;



Compulsory vaccination of dogs for three years without quarantine has practically eliminated rabies

*Presented at the 65th annual meeting of the Indiana Veterinary Medical Association, Indianapolis, January 13, 14, 15, 1949.

in the last 12 months only one case has been reported and that was in an unvaccinated dog brought into the county a few weeks previously from another state. Veterinarians in the county played an important rôle in the originating and promoting of the plan and have been given deserved credit for its success. This should be a fertile field in which the small animal practitioners throughout any state could develop something really worthwhile. Rabies must be controlled—it behooves us as practitioners to rise from our lethargy and to accept the challenge which this disease presents.

Wounds of the Eye.—The instruction from school that we all remember, was "on examining a lame horse always look for foreign objects in the foot," can certainly be applied to wounds of the eye. One experience of treating an ulcer for two weeks and then finding a Spanish needle beneath the third eye lid emphasizes sufficiently the need for careful examination of every case. It is good technic and good psychology to examine the eye thoroughly.

In corneal injuries due to accidents, our experience has been, that overtreatment is often worse than no treatment. Our best results are obtained by protecting the cornea by suturing the eye lids together with mattress sutures combined with the application of a mild antiseptic and anodyne eye ointment. Most animals will not try to rub or scratch the eye when treated this way. The sutures can be left for seven to ten days before removal. Our theory is that nature will do a good job if you aid in protecting the part from further injury.

Otitis.—Most cases when we see them are of chronic nature. The animal should be anesthetized and the ear examined carefully to determine whether the condition is parasitic or non-parasitic. If parasitic, the ear should be cleansed thoroughly and any of the numerous preparations used for sarcoptic mange applied. If non-parasitic, and definitely chronic in nature, surgery is indicated.

If the condition is acute or semi-acute, the ear should be cleansed and "pellitol" applied. We have tried numerous other preparations but we always come back to that old stand-by.

We have found that overtreatment of these conditions may be inhibitive to natural healing.

Bite Wounds.—The rule to remember is "don't suture a bite wound." During the war it took a directive from the Surgeon General's office to keep eager young doctors from suturing up dog bite wounds. Treat them as open wounds. Explain to the owner that the area surrounding the wound is crushed and injured, that one merely retards healing by suturing and may add to the seriousness of the general picture. Always inform the owner the wound will appear worse in four or five days. In dogs severely bitten don't give a prognosis that is too favorable. There may be internal injuries which won't show up for two or three days. General medication is indicated in severe cases. Sulfonamide drugs *per os* and penicillin injections must be considered sound therapeutics in severe wounds.

Internal Injuries.—Again our experience has been, "overtreatment is worse than no treatment." The most common serious result of the injuries is hemorrhage. We must remember that a dog's blood clots very rapidly; thus a dog has a distinct advantage over farm animals in recovering from severe internal wounds. Surgery is seldom practical. The injection of any drug which may lower or raise blood pressure is not without danger. Injection of coagulants is probably indicated. How much good they do is questionable. Our experience has taught us to bind the body firmly, to apply heat and blankets, and to keep the animal as quiet as possible until hemorrhage and shock are controlled. Always make only guarded statements as to prognosis in internal injuries. Tell the owner serious symptoms can show up any time, but will usually show up in three or four days after an accident. Vomiting either early or late is a symptom we don't like to see.

Fractures and Dislocations.—These are subjects within themselves but I would like to mention a few facts. One does not have to be an expert or a specialist to handle a large percentage of the fractures and dislocations

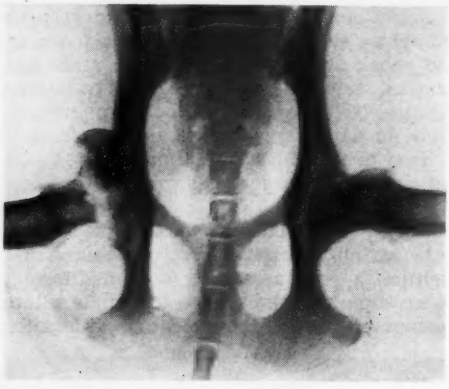
Good results are obtained by the use of a simple Thomas splint

commonly met, nor does one need a lot of special equipment. X-rays, fluoroscopes, and special splints are needed in extreme cases, but it is surprising what good results can be

obtained by the simple Thomas splints made individually from No. 7, No. 9, or No. 11-gauge wire, or with any light wood as a base for a cast, or by the use of friction tape, or even by just letting Nature take its course.

Compound fractures of the leg that, at first, look hopeless may make an uneventful recovery if one doesn't try to do too much, or to be too fancy. Stabilize the affected member in a Thomas splint and treat as an open wound.

In luxation of the coxa, which is quite common, one must differentiate the condition from a fracture. Of course, they frequently occur together. One simple test which we use is to place the animal on its back and extend both hind legs. If the affected leg is disjointed, it is noticeably much shorter than the other. A symptom commonly noted is that the leg is held adducted, the foot even sometimes crossing the opposite leg. Symptoms of a definite fracture are lacking, but a grating sound can be detected in the area of the hip joint. Of



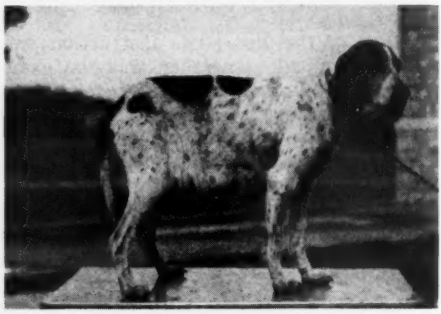
Luxation of the coxa must be differentiated from a fracture as shown in x-ray illustration

course, the fluoroscope will show it beautifully and in addition any fracture of the parts which may be present. For simple luxations, which most of them are, a simple technic for reducing them is:

1. Anesthetize animal completely.
2. Have someone hold the pelvis of dog firmly.
3. With the right hand firmly extend the affected leg, applying traction backwards and rotating, if the left leg, clockwise; if right leg, counterclockwise.
4. At the same time with the left thumb exert pressure downward and backward over the most dorsal part of the femur. Reduction is usually not too difficult. A simple method of keeping the parts in place is merely to bind up the leg firmly by flexing the stifle and hock joint and taping securely and keeping in this position for one week. It doesn't always work, but it does in the majority of cases.

Tumors.—Little did we think when we learned the definition and the various types of tumors that they would some day play such an important part in our practice. A practical approach to the satisfactory treatment of external tumors is briefly as follows:

1. Make a thorough and practical effort to determine whether the tumor is benign or malignant.



When it is deemed advisable do not hesitate to operate

2. Explain clearly to the owner the chances for satisfactory surgical treatment.
3. Do not hesitate to operate. The owner usually wants it and will be satisfied whatever the outcome, if he has been properly forewarned.
4. If hopeless, advise and insist on euthanasia for humane reasons.

This is a field where I believe in taking a gamble—maybe treading where some would fear to tread; but, everything considered, making our clients happy and appreciative is part of our function.

Skin Diseases.—I firmly believe that 95% of skin diseases in dogs is parasitic in origin. To be sure, all skin lesions should be examined under the microscope. Demodectic mange can be diagnosed easily. Sarcoptic mange is sometimes difficult to diagnose, numerous slides may be made and parasites not found. But if a dog scratches all over, even though no lice, fleas, or ticks can be found, give him a lime and sulphur dip every third day for four or five treatments. I have seen conditions diagnosed as "infectious dermatitis," "neuritis," "summer eczema," etc., yield to this treatment. The truth is, the animal really had sarcoptic mange.

Fleas cause more skin troubles than most of us realize. I don't say they are easy to control but the owner can, at least, be told what is causing the trouble. Always examine the hair

coat for the presence of lice, especially among such breeds as cockers, collies, and airedales. An animal badly infested should be clipped. A soap made by adding six ounces of "deritone" to one gallon of liquid shampoo makes an excellent flea and lice soap. When washing a dog with this preparation, leave the lather on for 15 minutes before rinsing. A statement to the owner, that a well cared for dog has a minimum of skin trouble, will help to put the blame where it belongs.

Ovariectomy.—A discussion of this simple operation is not necessary. Stock statements made by us concerning the operation are:

1. If the owner does not wish to breed the animal, spay her. This saves the owner trouble twice a year.
2. This operation should not be performed on an animal less than seven months of age unless the owner insists.
3. Some animals tend to take on weight following the operation; but then many unspayed cases do the same thing as they grow older.
4. Females that have been spayed never have metritis and rarely have mammary tumors.
5. Animals that are spayed may show age a little more rapidly but this is not too important, even in hunting dogs.
6. The operation rarely changes the disposition of the animal, materially.
7. No animal is too old to operate upon, if she is in good physical condition.

Females that have been spayed never have metritis and rarely mammary tumors

Dystocia in the bitch.—Just a few statements to be taken for what they are worth.

Discourage the use of forceps in dystocia when the pups are valuable.

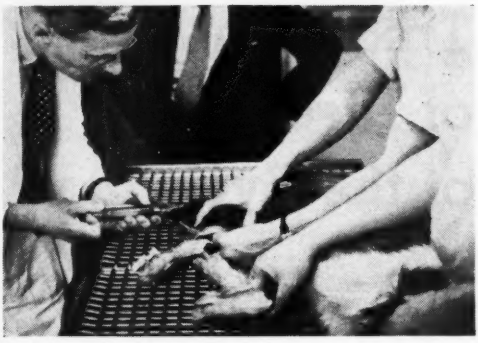
Cesarean section is so easy and simple—don't hesitate to advise it. The operation is not complex so don't try to make it appear difficult.

There is something wrong with the technic if the operation takes more than 30 minutes.

The female and pups are better off at home, following the operation.

One does not have to be given the odds to make the entire procedure successful and the owner happy.

Euthanasia.—This is a service that no one really likes, but it must be performed. It's a procedure which, when accomplished correctly,



In euthanasia if the owner wishes to watch do not discourage him

is very satisfying to the owner. Don't think because it is the end that it is not important. Somnopentyl injected intravenously is our choice. The dose is two or three times the amount necessary to anesthetize the animal. Inject it as rapidly as possible. Make sure the animal is dead before you tell the owner, "all is over." If the owner cares to watch, never discourage him. Seeing is believing—don't think your clients don't talk about the painless and easy method you use.

In closing, please allow me to make the following general remarks regarding practice.

Owners usually want to know the truth and the cold facts. Dr. Charles Mayo once said, "Sympathy is a luxury that a good doctor can ill afford."

Give service to the best of your ability—if that is not good enough for your clients, they have come to the wrong office.

Remember that ethics has to do with something more than the size of your name in the telephone directory, or the electric sign over your office, or the ownership of a dog ambulance, or any and all outward symbols of our profession.

We determine the important ethics of our profession in the daily operation of our practices. It ill behooves any of us to speak of the ethical or unethical conduct of another member of our profession. If we are busy giving honest service to our clients, we will have little time to scrutinize our fellow practitioners.

One ambition of every man should be to make his locality a better and happier place in which to live. To that end, every veterinarian owes it to his profession and to his community to play well his part.

Diagnosis and Treatment of Diseases of the Eye*

By W. B. Magrane, D.V.M.
Mishawaka, Indiana

WHEN first taking under consideration any diseased or surgical condition of the eye, anatomical structure should be firmly fixed in mind. While a thorough knowledge is desirable, even to including the embryology of the eye, the better to understand any condition that may be presented, it is not absolutely essential nor practical in a diversified small animal practice.

Our routine examination of eyes follows this procedure. In the event of a suppurative process, we first cleanse the eye thoroughly, then instill a few drops of 2% butyn, wait for its anesthetic effect and proceed first to grasp the membrane nictitans and look under it for foreign bodies.

Having completed this portion of the examination we next prefer to examine the animal's eyes in a dark, or darkened room with the aid of the Beebe loupe and a pen light. A splendid view of the fibrous tunic (including the cornea, sclera and conjunctiva may be obtained in this manner. The iris and lens too may be examined by this means, but when further examination is indicated we resort to the ophthalmoscope; provided, of course, the cornea is not so clouded as to negate its use.

The ophthalmoscope is a relatively simple instrument to use and is certainly conducive to a better understanding of the condition involved. In the dog a minus three diopeter reading is used when commencing a study of the retina and optic nerve head. This is because, as all know, the dog is myopic and the average has been determined to be —3. The normal in the horse happens to be 1+ diopeter of hyperopia. Edema of the optic nerve papilla can be measured by this means as it is known that every three diopeters change from the normal equals approximately one millimeter. One may ask, what is so important about knowing whether or not there is edema of the papilla? The answer is that it may be an indication of vitamin A deficiency, skull fracture, nephritis, a brain tumor, or other brain disorder. Then again, if a funnel shaped papilla or excavation of the disc, as it is known, can be seen, we can suspect glaucoma.

These conditions are encountered only rarely and it suffices to say that by repeated use of the ophthalmoscope one will be gratified by the amount one can learn of inner eye structure. That is to say, by changing the diopeter reading, while examining the eye, from the normal —3, gradually to —20, +20 and down the scale again, the iris, lens, anterior chamber and cornea can be studied for any pathological change. In examining the human eye, the slit lamp is used for this purpose to great advantage, but this apparatus is not practical in veterinary medicine because of the cost and also because it requires complete cooperation from the patient.

In a discussion of a few of the more common external diseases of the eye we should commence with conjunctivitis. The type most frequently encountered is what we refer to as the catarrhal form. It is characterized by

*Presented at the 65th annual meeting of the Indiana Veterinary Medical Association, Indianapolis, January 13, 14, 15, 1949.

vascular injection and congestion of the conjunctiva with pinkish to red coloration. A grayish white mucopurulent discharge in clots, strings or liquid is evident and the lids are swollen and raw in the acute form. There is, ordinarily, increased lacrimation and some photophobia. As in any diseased condition of the eye the causes are varied and often are difficult to ascertain. It is well, however, to question the owner as to the animal's diet, whether it has been riding with its head out the car window, whether confined to a dusty run or housed on dirty, dusty straw? Other mechanical causes frequently encountered are entropion, ectropion, follicular mange of the lids, or near the lids, and occasionally, trichiasis.

Ordinarily this form of conjunctivitis responds readily to simple washes and soothing bland ophthalmic ointments. For cleansing purposes, and for what disinfecting properties it may have, we use an eye wash consisting of 1:4,000 bichloride of mercury in physiological saline solution for practically all diseased conditions. In the catarrhal form of conjunctivitis that is characterized by severe edema, we add 15 to 20 drops of 1:1,000 adrenalin to the ounce of collyrium when it is dispensed. In the mild form we dispense castor oil, in addition to the foregoing, and prescribe a drop on the eyeball two to three times a day after first cleansing the eye. In cases exhibiting more than the usual amount of photophobia and discomfort, pontocaine hydrochloride ointment as indicated, for its analgesic effect is added to the treatment.

If the conjunctivitis takes on the acute purulent form, which is similar to the catarrhal except that all the symptoms are exaggerated and is usually accompanied by some involvement of the cornea, we then use sulfathiazole eye ointment, 5%, following the wash. Acute purulent conjunctivitis, ordinarily, is caused by staphylococcus or streptococcus infection, whereas the catarrhal form is mechanical in origin. Cats are quite subject to this acute, purulent form of conjunctivitis. If either of these conditions fails to respond to treatment after several weeks and becomes chronic, we then use yellow oxide of mercury, often with good results, in a few days.

We have used penicillin ophthalmic ointment, and still use it occasionally, but sulfathiazole ointment has been just as effective in our experience and I believe in certain cases more efficacious than the penicillin. Oculists with whom I have discussed this, report similar experiences.

A third form of conjunctivitis, commonly encountered is the follicular type. It is not usually accompanied by pus, but it is painful. When pulling back the membrane nictitans a number of millet seed like swellings will be noted on its inner surface and often on the remainder of the palpebral conjunctiva. This is ordinarily a chronic condition. In our practice we cauterize these swellings with a piece of copper sulfate crystal, being careful not to brush the eye, and then immediately flooding the eye with simple bichloride collyrium. It requires several assistants to restrain the animal successfully and perform this little feat even though the eye is anesthetized. After treatment consists of the use of the wash and castor oil already referred to, or sulfathiazole ophthalmic ointment for a few days. Usually only one cauterization with the copper sulphate crystal is necessary.

Two other manifestations of conjunctivitis are known as granular and exanthematous, but are not seen often enough to warrant much discussion. The granular is similar to follicular but more serious and nearly always affects the cornea, resulting in pannus. Exanthematous conjunctivitis is usually associated with horse pox, cow pox or, occasionally, with distemper. It occurs as little vesicles on the conjunctiva.

Keratitis in general presents the following symptoms:

1. Cellular inflammatory infiltration of the deeper layers of the cornea—chiefly the substantia propria, which makes up about 90% of the cornea.

The syndrome may be followed by (a) complete absorption of the infiltration, or (b) incomplete absorption, leaving opacities, or (3) suppuration with formation of an ulcer.

2. The second general symptom of keratitis that may occur, is limited or generalized vascularization, the blood vessels being derived from the conjunctival loops at the limbus.

3. There is often a complicating conjunctivitis.

4. Neighboring deep parts are frequently involved (the iris and ciliary body), and as a result there may be hypopyon (pus in the anterior chamber).

We consider, first, in a discussion of keratitis, the superficial type. The inflammation is limited to the epithelium and superficial part of the substantia propria and is characterized by dullness of the cornea and photophobia. Usually there is complete resorption in a few days, even if left untreated. The therapy used, however, consists of a foreign protein injection or two, either sterile milk or omnadin and our collyrium, castor oil or pontocaine eye ointment, depending on the degree of photophobia. We prefer concentrated omnadin for

its foreign protein effect, and use it exclusively in dosages of from 1cc to 3cc depending on the weight of the patient and severity of attack.

Next to superficial keratitis in order of frequency of occurrence I would place ulcerative keratitis with and without suppuration. These cases are presented in all stages—from the minute pinpoint ulcer of the cornea to the deep perforating ulcer with prolapse of the iris through the cornea. Here again I wish to stress the desirability of making a thorough examination of the cornea, from all angles, preferably with the use of the Beebe loupe and good light, or the ophthalmoscope. If there is some doubt as to the presence of a beginning ulcer, or one wishes to define the outline of the ulcerative process more certainly, a drop of 2% fluorescein dye on the eyeball, followed by a saline flush, will facilitate the examination. The eventual loss of an eye may most certainly result from failure to note and treat properly a beginning ulcer, regardless of how simple or superficial it may have appeared.

Having made the diagnosis of beginning ulcerative keratitis, we routinely employ the following treatment. The eye, of course, has been anesthetized. We shave a wooden applicator to a fine point, or a toothpick may be used, wrap a wisp of cotton on the end lightly and cut any loose end fibers with scissors, dip the point in tincture of iodine, wave in the air for a few seconds and proceed to dot the ulcer, being careful to include especially the whole margin of the ulcer. Cauterization is rarely indicated more than once. We then instill a few drops of 1% atropine, provided the ulcer is in or near the center of the cornea, or eserine (0.5%) if the ulcer is peripheral. We seldom encounter the peripheral type ulcer. An injection of foreign protein is then given and our collyrium and sulfa ointment dispensed for use at home. In addition, we always dispense vitamin A and riboflavin to be given for one week, regardless of the general health of the patient. Vitamin A is used in amounts of from 25,000 to 50,000 units daily, and riboflavin from 10 to 20mg daily. The owner is instructed to return the animal in 48 hours at which time we repeat the foreign protein, and reinstill atropine.

The great majority of these cases can be discharged at this second visit, as usually the spread of the ulcer shows evidence of having been checked. If complications occur, the ulcer seems to be spreading, vascularization is starting, or if the condition takes on the chronic form, we have used *x*-ray irradiation therapy with splendid results, of which I shall say more later. As a last resort, in an attempt to check the spread of the ulcer, the human ophthalmologist advocates a straight incision, across the top of the ulcer, extending the full width of the cornea, being careful, of course, to avoid cutting the iris. We have not as yet employed this quite radical procedure.

The sequel of corneal ulcers may include:

1. Pus in the anterior chamber (hypopyon) for which we resort to paracentesis, to be discussed later.
2. Iritis.
3. Iridocyclitis.
4. Uveitis.
5. Complete perforation with prolapse of the iris.
6. Panophthalmitis.

If complete perforation occurs, or has occurred when the case is first seen, with prolapse of the iris through the corneal opening, we can do nothing at the time but treat the eye symptomatically in an attempt to check the infection and prevent panophthalmitis. Of course, the eye sight is gone anyway, but occasionally the eye can be saved intact, which, to some owners, is preferable to enucleation. On occasion we have cut the protruding part of the iris off and had the eye heal after a fashion. For the most part, however, we have found that perforated ulcer with prolapse of the iris, leads to panophthalmitis and the necessity for eventual enucleation.

A third type of keratitis which is commonly encountered, is parenchymatous or interstitial keratitis. It is characterized by a diffuse infiltration of the sclera and cornea. Ulceration of the cornea is rare but the condition is nearly always associated with uveitis.

After the initial symptoms of irritation, one or more hazy patches appear on the cornea, near the margin or towards the center. If they commence near the margin, they migrate forwards toward the center; if at the center, others appear and fuse until finally the whole cornea looks lusterless and dull and in a short time becomes hazy, with a steamy surface, giving the general appearance of ground glass.

It is difficult, at this stage, to distinguish the inner structures of the eye with the ophthalmoscope. However, with the aid of this instrument, or the Beebe loupe, a closer examination of the cornea discloses the beginning of a vascularization consisting of bundles of brush-like blood vessels radiating more or less evenly from the periphery to the center. Vascularization is probably brought about to supply protective substances which cannot reach the cornea by the normal process of diffusion.

Objective symptoms again include photo-

phobia, pain and, in the majority of cases, suppuration. In young dogs both eyes are usually affected, while in aged animals the condition may be unilateral.

Although a few cases respond fairly well after extensive and varied treatment, such as has been described for use in the other forms of keratitis, it has been our experience that a substantial percentage invariably progress into that sequel known as pigmentary keratitis, with total blindness often resulting.

X-ray irradiation therapy has been used in our practice in 20 to 30 cases of interstitial and pigmentary keratitis with gratifying results. Each treatment consists of 140 R units. This is repeated at four-day intervals for from three to five treatments; three usually sufficing. The owner or an assistant, properly protected with lead gloves and apron, can, in most instances, restrain the animal satisfactorily during the therapy. One eye is shielded with lead while the other is treated. If the eye spread is not too great, both may be treated at the same time. In addition to the *x*-ray therapy, we routinely dispense vitamin A and riboflavin to be given at home. Other than the use of a mild collyrium for cleansing purposes, no other medication is used in the eye until the suppurative process has been checked.[1]

Before leaving the discussion of keratitis, I would like to elaborate for a moment on that operative procedure known as paracentesis. This procedure is indicated in certain forms of keratitis which refuse to respond to the usual methods, in certain types of ulcer of the cornea, after injuries or operations where the anterior chamber has become filled with blood, and in hypopyon. It is indicated also in glaucoma with exceedingly high tension in order to relieve the pain and to reduce the tension rapidly. It supplements the use of drugs in cases where a drug alone will not reduce the tension. Often when the tension has once been lowered by paracentesis, it can be kept low more readily with a miotic.

Several methods may be employed, with the use of a needle, a cataract knife or a keratome. We prefer the keratome. After making the incision at the upper limbus and draining the aqueous, we irrigate with a sterile penicillin-saline solution. A regular eye irrigator may be used or ordinary sterile, glass hypodermic syringe with a blunt needle will suffice. Within a very short time the puncture wound will seal, and new, fresh aqueous will fill the chamber. The theory is that the fresh aqueous has a definite beneficial action on the diseased process involved, through increase in antibody titer.

Iritis, iridocyclitis and choroiditis may conveniently be considered together, since whenever true iritis is present the other conditions accompany it. The term used for this inflammatory sequence is uveitis, meaning inflammation of the uveal tract or middle coat. However, for simplicity the expression "iritis" is usually employed.

We encounter primary iritis occasionally in practice, and it is worthy of our consideration, both from the prognostic standpoint and to be able to differentiate it from glaucoma. Most cases will last from one to four weeks; therefore it is important that the condition be recognized for what it is so that a proper prognosis can be given the owner. It is equally important to be able to distinguish between acute iritis and acute glaucoma because the two conditions are treated in a diametrically opposite manner.

Iritis is characterized by:

1. Loss of the glistening appearance of the iris.
2. An exudate of leucocytes into the aqueous humor.
3. Loss of mobility of the iris—that is, there is no constant contraction and dilation as in the normal.
4. Miosis—abnormal smallness of the pupil. In glaucoma the pupil is dilated, thus giving us a valuable differential diagnostic symptom.
5. Lymph stasis in the cornea, better known as corneal opacity or clouding.

The causes are varied but can often be determined by careful examination of the patient for focal infections, especially of the teeth, tonsils and prostate gland, in addition to which we have arthritis and rheumatic conditions as etiological agents.

All ophthalmologists agree that the most important measure in the treatment of iritis is prompt dilation of the pupil. Promptness is exceedingly important as synechia occurs quickly and soon becomes so firm that later efforts to break it up are unavailing.

Atropine sulfate in 1% solution or ointment is usually tried and if successful in producing full mydriasis is continued in sufficient amount to maintain this condition during the period of active inflammation. Atropine is of value not only for the mydriasis produced, but also because it paralyzes the ciliary body and hence relieves ciliary spasm, an important source of pain.

It is well also to keep the patient in a darkened room as much as possible. We use, in addition to the atropine, heavy and continued doses of foreign protein during the course of the disease, usually seeing the animal twice

[1]For an extended interpretation of the use of the *x*-ray in this condition, with examples, see the North *Am. Vet.* 29:582-584 (Sept.), 1948.

a week. And again, vitamins for whatever beneficial effect they may have. A last important measure is elimination or alleviation of the cause, if possible. The human ophthalmologist is now using typhoid antigen for its foreign protein in iritis with very good results. We have had no experience with it in animals.

Glaucoma, although not commonly encountered in dogs, is nevertheless not rare. In our practice, probably 80% of the cases seen have been in wire haired terriers. Glaucoma is not difficult to diagnose, if, again, a careful examination of the eye is made. As stated before, the symptoms will in many instances parallel those of iritis, except that in glaucoma the iris is well dilated. As the condition progresses a definite bulging of the eye is evident and with practice, on palpation of the cornea with the finger tip, it will seem harder than the normal. Another little test that may be used is to feather a piece of thread and rub over the cornea. In glaucoma there is no corneal reflex. Only theories have been advanced as to the cause of glaucoma. In some instances its occurrence has been thought to be due to blocking of the canal of schlem (the drainage system of the eye), occasionally by displaced lens, it may be congenital, or maybe secondary to other diseases of the eye. The treatment is medicinal or operative. Non-operative treatment consists chiefly in the local use of the miotics—eserine and pilocarpine. However, they are merely palliative measures, often proving of only temporary advantage. They may be used, though, in the prodromal stage to cut short the attack, or at other times if the owner refuses surgery. Operative treatment consists of either iridectomy, removal of the lens, or enucleation of the eye. Enucleation is performed as a means of preventing the spread of the condition to the other eye. This, however, has not always been an absolute preventive measure, in our own experience.

Report of Committee on Small Animals for 1948*

1. *Rabies.*—These statistics from the Indiana State Board of Health speak for themselves on the rabies situation in Indiana. Of dog heads sent in to the board of health laboratories, positive cases for the past three years are as follows:

1946, 308; 1947, 382; 1948, 817.

All cases of rabies should be reported to the local and state boards of health, whether or not the head is sent in for examination, so that a more accurate statistical picture may be had.

The four salient factors of control are: (1) vaccination; (2) elimination of strays; (3) registration of all dogs, and (4) quarantine until the epidemic is suppressed.

Every veterinarian owes a moral responsibility to his community to aid in the control and eventual elimination of this dread disease.

2. *Distemper.*—The incidence of cases has appeared to decline due to an increase in early vaccinations but the severity of infection seems to be greater. Many have noted that the secondary invaders are becoming resistant to the sulfa drugs and the use of penicillin in conjunction with the sulfonamides has become necessary.

Encephalitis following distemper has increased and the prognosis is still poor. Use of sedatives, rest, good nutrition, and elimination of internal parasites still seems to be the best treatment known. Encephalitis serum has not proved of much benefit unless used very early.

3. *Canine Infectious Hepatitis.*—This is a disease which appears to be widespread and yet the diagnosis is always questionable, unless proved on histological examination.

Since the diagnosis is difficult and the symptoms are so varied more research and clinical reports are necessary before a satisfactory report can be given.

4. *Feline Infectious Enteritis.*—This highly contagious disease is increasing yearly and causing a very high mortality among cats. Treatment now includes the use of streptomycin, with varied reports on the effectiveness of this drug. The use of mixed bacterins, sulfa drugs and penicillin has produced striking recoveries in many cases. An effort should be made by all of us to inform the public on the value of immunization against this devastating disease.

5. *Orthopedics.*—An increase has been noted in the use of the various methods of pinning fractures. Every type has its own particular merits and it is hoped that all practitioners will exert greater effort to employ such methods in daily practice.

6. *Geriatrics.*—One of the most recent aids in prolonging the life expectancy of old animals is the manufacturing of "prescription-type rations" for use in cases of kidney ailments. These rations contain easily assimilated proteins and afford a minimum stress on diseased organs.

*H. J. Magrane II, chairman, 65th annual meeting of the Indiana Veterinary Medical Association, Indianapolis, January 13, 14, 15, 1949.

The Business Side of Practice*

By L. C. KIGIN, D.V.S.
Terre Haute, Indiana

I HAVE been away from the practice a good many years, but I have never lost interest in the veterinary profession. I have tried to keep in contact with the veterinary profession as a whole and the men with whom I went to school. For the information of the younger men in the audience, I will explain that I formerly practiced veterinary medicine in this state. Later I was engaged in veterinary educational work, first in Nebraska and later at Purdue University. At present, and for a number of years past, I have been in the life insurance business.

The discussion on public relations this morning, interested me exceedingly. I hear that subject discussed a great deal at conventions of insurance men from one side of this country to the other. The main companies believe that the men in the field representing those companies, can be the best ambassadors; can create more good will, by their behavior and by their ethical dealings, than all of the paid good will, human relations creators that could be hired, regardless of the amount of money they would spend. I believe that also applies to any profession. It is the men in that profession, in their daily activity, that play the chief part in creating an acceptable attitude, or another kind of attitude, on the part of the public.

You have demonstrated your interest in good public relations, and I urge you not to overlook the part that each of you can play in your own community in raising the prestige of your profession to a higher plane. If you will keep that in mind every day, you will be surprised at the results.

The subject assigned to me is the "Business Side of Practice." Good business principles are essential in the practice of veterinary medicine or any other profession. It appears to me that too many professional men think that business belongs in the field of merchandising, industry, banking, etc. and fail to realize that their success depends upon the adoption of good, sound, ethical business principles.

It is good business for a veterinarian to have an interest in the welfare of his community. His interest will help build a better and more prosperous community and naturally, he will be more prosperous due to the effort put forth.

We are all grateful and proud of our democratic way of life. We have just ended a second World War to preserve it. In a recent report the National Association of Manufacturers, stated that in this country we are now nearer to the socializaiton of our industries than England was at the end of World War I. That is a pretty strong statement to come from the National Association of Manufacturers. It should arrest our attention. There is nothing more certain than change, but I am sure we can do something in our various communities to direct these changes to a more favorable condition than the communists would inflict upon us. We should neither ask nor expect the Congress in Washington to carry the whole load, but that is what many do. Recently the president of the chamber of commerce of one of our western states was presiding at a meeting when some matters that were rather controversial were being considered. A motion was made that the matter be carried to Washington, that they ask for aid, and so forth. The president said, "Gentlemen, I will resign as president of this organization if that motion is carried. If we do not have the brains to solve our local problems, if we cannot think these things through for ourselves; if we cannot coöperate, if we cannot master this ourselves, then God help us. We have been complaining, condemning, damning the centralized government. If we meant 10% of what we said, we should set an example and show that some problems can be worked out at home."

They did begin to work. They didn't go to Washington and ask for financial aid for this project. It was completed and today it stands as a very fine example of what can be done at home by the people in the community, whether it is a small community, a county or a state. Usually it takes only leadership to bring success in such undertakings.

In an organization like this one, tremendous good can be accomplished by good leadership and constructive thinking. We don't have to ask for much help from the outside, neither do we have to ask for a law. We have too many laws now. A law is only as effective as the support it gets from the public. People must be sold on it, before they are going to do anything about it, and there is where leadership in local communities comes in.

If I dare set myself up as a judge, it seems to me that we are giving too much thought to profits and not enough to the social ills that exist in our social structure at this particular time. Two years ago I was appointed trustee on one of our state institutions. It has to do with the correction of bad boys and I have had to go through hundreds and hundreds of reports, case histories, in that institution.

*Notes from an address at the 65th annual meeting, Indiana Veterinary Medical Assn., Jan. 13, 14, 15, 1949.

The only reason I accepted this responsibility is because it deals with young boys. When men are past 25, you can seldom change their habits much. But the little boys of 10, 11, 12, 13, that come into that institution from your community, and every community and every county in Indiana, are often changed into useful citizens, but it would have been so much easier to prevent them from going wrong back in your communities!

I have come to the conclusion that if we do not do a better job in our own communities in helping correct local maladjustments, some day the institution will have to be enlarged, doubled or tripled in size. Many times as you know, little can be done for these boys, after they have been spoiled in their home communities; and that means some other institutions will have to be greatly enlarged.

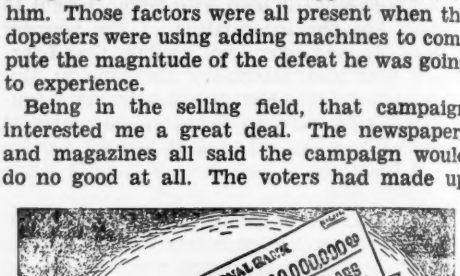
It has been my experience and observation that this community service will build a better practice for a veterinarian, a better practice for any professional man. It is an important phase of the "business side of practice."

I like to think of the wonderful way in which the veterinary profession has contributed to the welfare of our livestock industry and in more recent years the protection it has given to human health. Many persons don't know anything about the service of the profession to the cause of public health and, of course, they don't appreciate it. There is a community job for you. Tell those people, inform those people, so they will have greater appreciation and respect for you as a member of the veterinary profession. They won't read it, but tell them, giving them some facts, some information; that is the way to convert them. Never overlook an opportunity to sell your profession to everyone with whom you come in contact.

I am convinced that salesmanship is of paramount importance to a practicing veterinarian. It is equally important to every profession, as well as to our different businesses. We are constantly selling or unselling people with whom we come in contact. We are selling them on ourselves, selling them on our business, or else we are doing just the reverse, we are unselling them. This selling business enters into every vocation in this world.

I am not going into politics, but I want to talk about the selling job that was done by the man recently elected President of the United States. I am not talking about the man but about an idea. You know every magazine, every paper you saw, declaimed that Harry Truman was going to be defeated. It was a dead cinch. The cabinet of the other man was all selected. The *United States News* had it all outlined. But that didn't seem to affect Harry. He went out in his natural way without fanfare and he campaigned as few men have ever compaigned. He did a selling job that will probably stand as a record for a long while. It is begging the question to say the C.I.O. elected him or the farmers elected him, or prosperity elected him or his opponent elected him. Those factors were all present when the dopesters were using adding machines to compute the magnitude of the defeat he was going to experience.

Being in the selling field, that campaign interested me a great deal. The newspapers and magazines all said the campaign would do no good at all. The voters had made up



Courtesy American Foundation for Animal Health

Sell your profession to livestock owners so they will realize that if they depend upon and cooperate with the veterinarian they need not suffer so many millions of dollars annually from preventable or curable diseases

their minds in the spring how they were going to vote in the fall, so it was just wasted energy. I tried in my humble way to find out whether there was a change in the minds of people and if votes were really changed, in other words, did the campaign make sales.

I didn't hear the man, but persons who did go to hear him, told me that they came away feeling differently, because of the naturalness of the man and his earnestness. That comes right back to one of the oldest and most quoted principle of selling. We have got to have conviction in our hearts and express ourselves in a natural way to be effective. My informants told me that natural way, not trying to imitate anybody but doing it in his own way, saying it in his own words, seemed to make a very great impression.

Our attitudes, mannerisms, habits and personalities either impress people favorably or

unfavorably. The things we say should be weighed from time to time, the technic of our work should be improved constantly, the impression it makes will either sell or unsell clients. The first and most important thing is to be sold on our profession ourselves, just as Harry S. Truman was sold on his policies and his aims. Great organizations have become great because they have studied and applied the fundamentals of salesmanship to their businesses.

In my visits to the great Mayo Clinic, I came away convinced that salesmanship has played no small part in making that institution stand out as one of the best in the world. It has been one of the greatest selling organizations. But of course, they had something to back up their sales talk. Good selling must always be supported with intelligent service or good commodities.

I have given a great deal of thought to what I was going to say here today and I am convinced that we must awaken ourselves to the importance of better business methods in our profession, and also we must become better salesmen. If you think you can make a contribution without giving some thought to your actions, to your behavior, to your business methods and so forth in the community, you are mistaken. You can employ all the public relations and human relations in the world, and all the publicity releases, and clippings and what not, but, gentlemen, it won't do much good. You, individually and collectively, can play the greatest part in creating that good will that you so rightfully deserve.

Report of Committee on Poultry Diseases*

The general run of poultry diseases was encountered during 1948. They were controlled sufficiently well to satisfy the poultry raisers concerned.

However, late in the year, avian pneumoencephalitis became epidemic in its spread. Many laying flocks went through the disease with complete or nearly complete cessation of egg production. Fortunately, mortality in mature stock was low, or nil. Most flocks returned to production in approximately two weeks without going through a molt.

The ravages of this disease in broiler plants has caused considerably heavier losses. Some broiler plants have reported as high as 40% mortality in broilers four weeks of age and older.

It is apparent that vaccination against this disease, when the birds are about to lose their inherited immunity, is necessary. The use of a dead vaccine appears to be practicable for broilers.

The committee cautions veterinarians to exercise care in diagnosis of disease in chicks. To avoid a snap diagnosis, as a gasping in chicks is more likely to be due to pneumoencephalitis than to infectious bronchitis or the pneumonic type of pullorum disease.

Report of Committee on Swine Diseases**

Hog cholera continued as heretofore, to be the number one disease of swine. In 1948 it occurred in portions of the state where it has seldom been seen. There were some instances of destructive outbreaks of cholera in vaccinated animals. This was especially true of brood sows which had been vaccinated the previous year. After the pigs were vaccinated, cholera appeared in the sows and in some cases practically all of them were lost.

Transmissible gastroenteritis in baby pigs was somewhat more prevalent than previously. Death losses in baby pigs due to other causes continued to be a serious problem.

Anemia in young pigs was observed several times during the spring; and also again during the fall and early winter.

Mange, although an easily controllable disease, still costs the hog raiser heavily by causing unthriftiness.

Influenza has caused considerable loss in some herds, particularly where hogs were not well cared for.

Mastitis in brood sows was very troublesome in several herds, more especially in summer.

Hemorrhagic dysentery occurred in widely separated parts of the state and caused heavy losses in some instances where a large number of hogs was kept in a small area.

The distribution of cholera and dysentery often followed the usual pattern, in that outbreaks occurred after hogs were purchased at sale barns or were brought in from outside the state.

*E. S. Weisner, 65th annual meeting of Indiana Veterinary Medical Association, Indianapolis, January 13, 14, 15, 1949.

**Dale S. Kline, chairman; 65th annual convention, Indiana Veterinary Medical Association, Indianapolis, Jan. 13, 14, 15, 1949.

Report of Public Relations Committee*

The Committee has endeavored to create an appreciation of the services of the veterinarian, to establish in the minds of the public, the relationship of the health of animals to that of man, and to bind together the veterinarians of Indiana in a more unified effort in behalf of our profession. We feel we have accomplished a great deal in this direction.

A number of quotations from newspaper clippings illustrate the kind of publicity the profession has received.

An extract from Doctor Clark's paper, which appeared in no less than 12 publications, reads: "The essential importance of a healthy animal population to human health is the prevailing topic." Also, "Veterinarians must assume their full responsibility for the betterment of public health by protecting the health of food producing animals and being constantly on the watch for any disease communicable from animals to man."

Quoting from Dr. C. F. Clark, State Veterinarian of Michigan: "Each herd owner should, with the coöperation of the local practicing veterinarians, develop a suitable program for the control of brucellosis in his herd."

"Bad management and bad nutrition kill more pigs than infectious diseases."—Doctor Steenerson.

Your attention is called to the extensive campaign that the Associated Serum Producers have planned for the improvement of public relations of practitioners. It includes releases to some 3000 newspapers, releases to state and national farm papers, illustrated articles to 2600 weekly and rural papers, radio news service to 400 radio stations, educational messages on what the veterinary profession means to mankind, as paid advertisements in 13 leading farm magazines. Also special hog cholera warnings, a radio campaign over 19 radio stations, urging hog cholera vaccination. The production of the motion picture "Valiant Years" was a notable achievement.

I think you will agree that this program of the Associated Serum Producers is of far reaching importance and merits the approval of every veterinarian in this room. Surely, this great organization had given much thought to every angle before it approved this program. The plan not only necessitates the outlay of an enormous sum of money, but requires the services of a considerable personnel.

Our methods have been improved and our knowledge increased to a much greater degree than has been made public. Modesty is a virtue that should be practiced by all learned individuals, but as a group, I think it is in keeping with good taste to keep our profession before the public. There is no such thing as standing still—we either go forward or are passed by the onward march of others.

Quoting Dr. C. C. Dobson: "The only kind of legislation which we promote is that which is in the interests of the livestock industry." Also, "The veterinary profession has a heavy responsibility in the betterment of public health, a fact which is recognized by the State Board of Health of Indiana. The man who does not belong to his association is allowing the door of opportunity to close in his face."

Attention is called to a statement of Doctor Joseph C. Bateman, president-elect of the North Carolina State Veterinary Medical Association, who wrote this committee as follows: "I wholeheartedly agree with Doctor Coffee, of Kentucky, when he said, 'You have the most outstanding public relations department in the country.' A similar remark was made during the Ohio State Association meeting."

We have had a two-year demonstration of what can be done to build up the prestige of our profession by creating public understanding. Another program which has been started is the formation of a speakers' bureau through the coöperation of the Indiana Congress of Parent-Teacher Associations. This activity has been but started, although the ground work was laid last summer.

The committee feels that a definite decision should be made at this convention, whether to support this program with your financial contributions as well as your interest and enthusiasm. Your interest and coöperation are as important as your money.

Unless we continue the program, the public will soon forget us and we will again become obscure. Can we afford to go back to obscurity?

No doubt this program would have been more productive under better leadership. I am cognizant of my limitations. I hope you may see fit to continue this program under a more efficient leadership. We have much talent among the younger members of our organization who are willing to respond if given encouragement.

I would like to hear this matter discussed before we vote on it—objections as well as endorsements.

Please remember too, if you vote to continue this work you will be expected to show an interest, be active, as well as contribute money.

*By O. C. Shockley, D.V.M., Chairman, 65th annual meeting Indiana Veterinary Medical Association, Indianapolis, January 13, 14, 15, 1949.